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SAE OFFICES

Headquarters

29 West 39th St. New York, N. Y.
Telephone: Longacre 5-7170

A. W. Herrington, President

David Beecroft, Treasurer

John A. C. Warner, Secretary
and General Manager

West Coast Branch Office

530 West 6th St. Los Angeles, Calif.
Telephone: Vandike 3915

E. F. Lowe, Asst. Gen. Mgr.

Detroit Branch Office for War Activities

917 New Center Bldg. Detroit, Mich.
Telephone: Madison 7495

R. C. Sackett, Staff Representative

SAE Journal Editorial Office

29 West 39th St. New York, N. Y.
Telephone: Longacre 5-7174

Norman G. Shidle, Executive Editor

Advertising Offices

29 West 39th St. New York, N. Y.
Telephone: Longacre 5-7170

C. B. Whittelsey, Jr., Business Mgr.

E. L. Carroll, Eastern Adv. Mgr.

29 West 39th St. New York, N. Y.

A. J. Underwood, Western Adv. Mgr.

3-210 General Motors Bldg.—Detroit, Mich.
Telephone: Trinity 2-0339

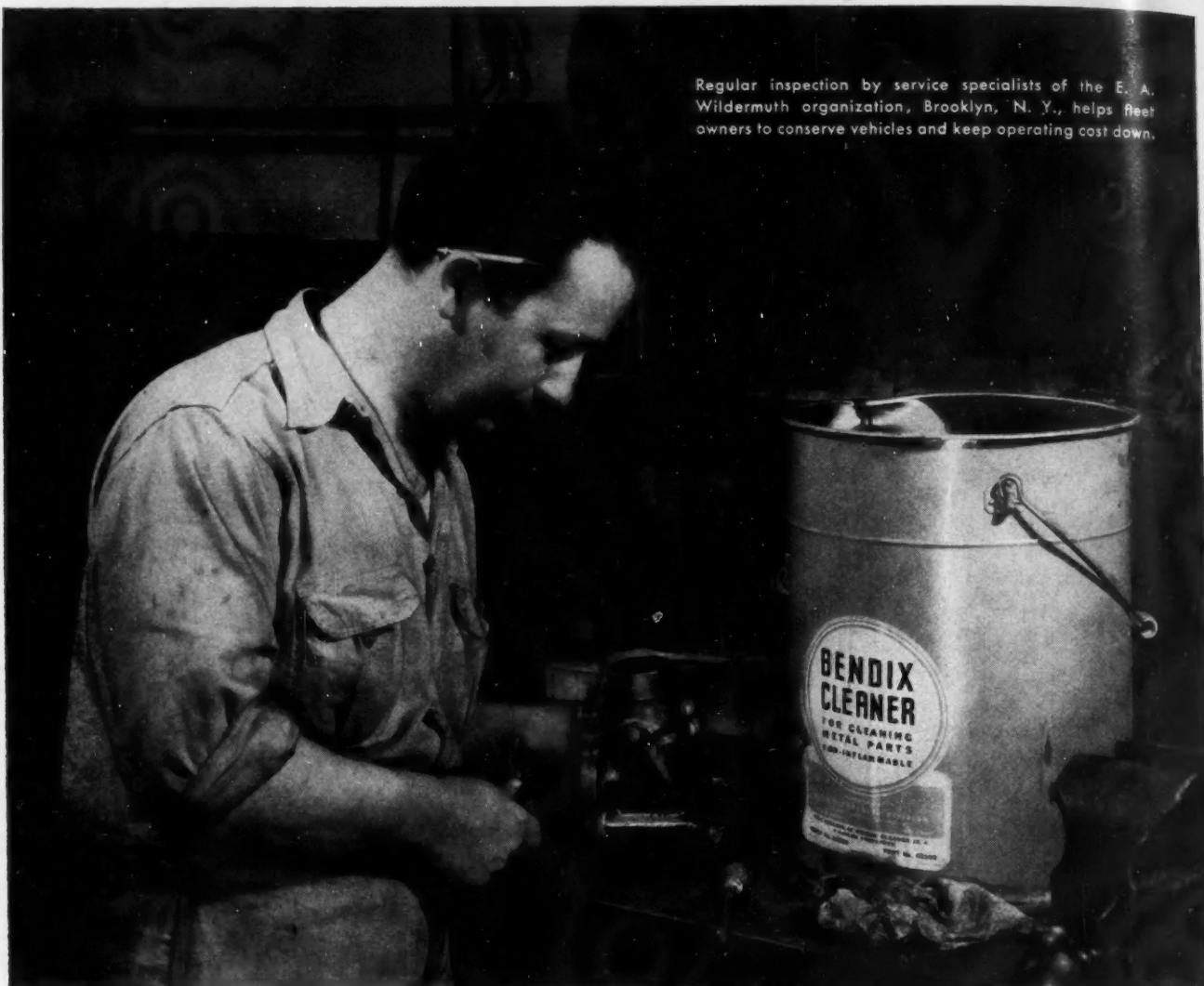


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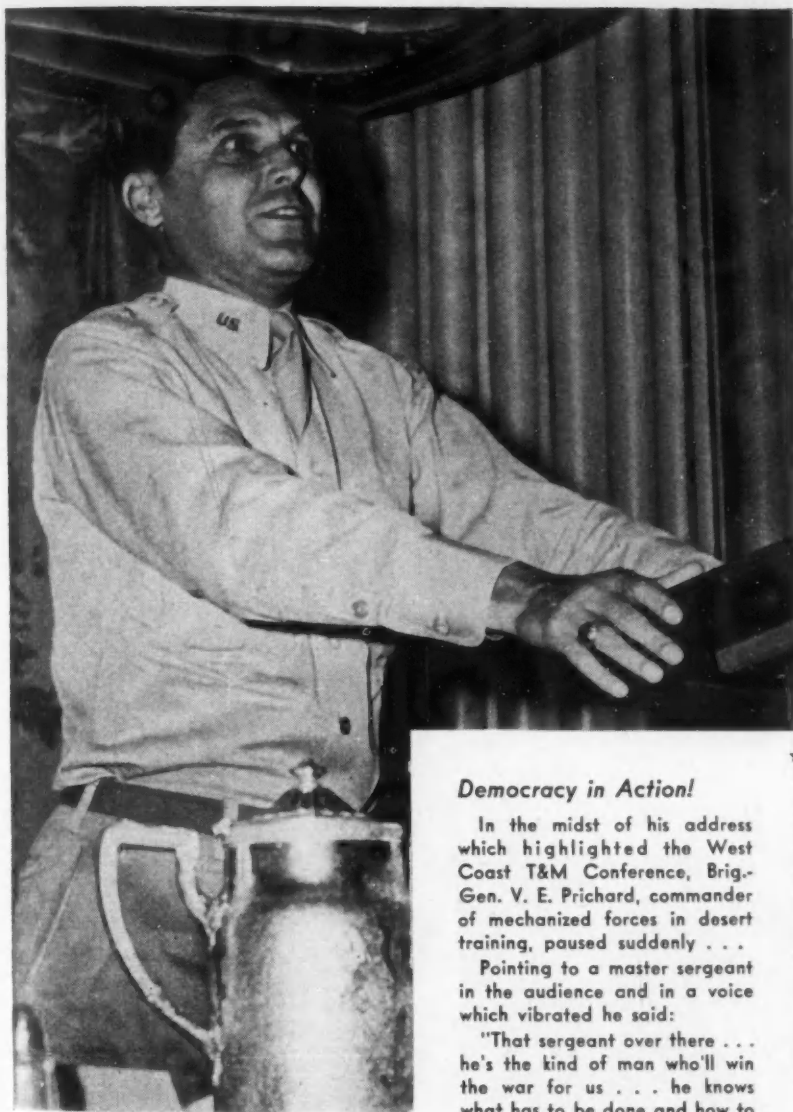
West Coast

T&M Conference Scores Top Success with Army Themes

by ROY COMPTON

FEATURED by the largest attendance and "warmest" sessions in its history, the SAE West Coast T&M Conference kept 'em rolling in high gear when it met in Los Angeles Aug. 20-22. It was almost as if the entire Conference were in the Army—at least for preliminary training—and there was plenty of word-combat.

All got a kick out of the debates. Guest speakers who invited questioning took some personal observation comments disguised as questions. They sallied back, too, and if a speaker talked mule-skinner language he left no doubt as to its meaning. The spirit of democracy—that's what this meeting was and it was a grand and glorious success.



Democracy in Action!

In the midst of his address which highlighted the West Coast T&M Conference, Brig.-Gen. V. E. Prichard, commander of mechanized forces in desert training, paused suddenly . . .

Pointing to a master sergeant in the audience and in a voice which vibrated he said:

"That sergeant over there . . . he's the kind of man who'll win the war for us . . . he knows what has to be done and how to do it . . . Hell, we officers just figure out the tactics and give the orders."

Brig.-Gen. V. E. Prichard, commander of mechanized forces in desert training

"ODT Day"

Thursday, opening day of the Conference was programmed as "ODT Day." The "Truck Operation Session" was held in the morning. P. H. Ducker, superintendent of operations, Southern California Edison Co., was chairman and Fred C. Patton, manager, L. A. Motor Coach, Los Angeles, was technical chairman.

Tire Saving Urged

Paul Barksdale D'Orr, regional administrator, Office Price Administrator, was the first guest speaker. Speaking on the subject, "The Tire Situation," he said that without automotive equipment commerce stops and our military cannot survive. "The SAE has a most important civic role in the country's crisis," he said. "Your part may be in the rear of the stage but the play cannot go on without you. He declared the threatened scarcity of rubber is one of the by-products of the war and rationing is its legitimate child. Its illegitimate children are hunger and want.

"You gentlemen have produced the vehicles. We can't run them on iron rims, so we are confronted with the problem of conservation. Your great contribution to the war is in the development of machinery which can be used to win it. You make the tanks, the trucks and hundreds of other vehicles. They require rubber and in consequence the stockpile for civilian use is being depleted. I recognize you gentlemen as one of the greatest bodies of scientific men in the country. Without you, neither the war effort nor civilian economy can be maintained. I ask you to turn some of your knowledge and genius into the conservation of rubber."

Discussion of Mr. D'Orr's address developed previously unexpressed angles to the tire conservation program as reflected in statements of fleet-operator members. Among these were: cities should eliminate all unnecessary boulevard stops—starts and stops wear rubber; speeds in municipalities should be reduced as well as those on the open road; trucks have to keep pace with traffic and this wears tires; passenger cars held to 40 m.p.h. on open roads with temperatures around 100 overheat; line-haul trucks of types most generally used in the West are inefficient at 40 m.p.h. (present gear ratios produce a road speed of 37 or 45 m.p.h. and they can't be changed under existing conditions—split gear operation is impracticable);

life of heavy equipment at 25 m.p.h. in cities is less than at 50 m.p.h. on open roads.

Safety and Inspection

"Safety and Inspection—Vehicle and Driver" was the subject of a paper by Robert L. Miller, fleet engineer, General Insurance Co., Los Angeles, a one-time truck driver. He traced the trend toward bigger equipment over the past 25 years and the problems of operation that have come with each change. Safety and inspection, he regards as analogous. "Keep your equipment in the minor repair class and you will save time, overhead expense and money on major repairs and overhauling," he said. "Safety in driving and handling equipment, constant inspection and close cooperation with your drivers and mechanical departments will benefit you both materially and financially."

Look out for women drivers—they are coming and bringing a perplexing problem. Mr. Miller opened that subject in answer to a question from the floor. He said women drivers are good. He has records of fourteen who have been driving ten months without a scratch on the vehicles. Two drive truck-trailer combinations and make regular trips from Salinas to Los Angeles, 300 miles. A San Francisco union accords women drivers the same standing as men and if the union wants them to drive buses, they're going to drive, according to the experiences of that city's municipal railway. Speakers expressed skepticism as to women on buses and trucks. There was reticence when it came to positive declarations, however.

It was explained that Charles G. Anthony, manager of the Truck Association of Southern California, who was to be chairman of the afternoon Truck Maintenance Session was having "labor pains" and could not attend. David G. Shearer, *The Trucking Industry*, functioned in Mr. Anthony's stead. Verne G. Savage, superintendent of shops, City of Portland, Ore., was the technical chairman.

Diesel Bearings

"Bearing for Diesel Engines" was the subject of the paper presented by Russel A. Watson, Pacific representative for Federal-Mogul Corporation. The paper was prepared by Albert B. Willi, the company's chief engineer and originally was presented at the 15th National Oil & Gas Power Conference (the SAE Diesel-Engine Activity co-operating), in Peoria, Ill., last June. Excerpts from the paper follow:

"It is fundamental that there is no universal bearing material, good for any and



Cecil E. Ellis, Southern California Section, was general chairman of Conference



Roy Long, Los Angeles manager, ODT, Division of Motor Transport, told how to eliminate transportation waste

Builders of the Conference . . .

Officers of the Southern California Section, serving as hosts for the conference, were: Chairman, Foster M. Gruber; vice-chairman, Cecil E. Ellis; secretary, J. O'Hara Smith; treasurer, Ellis W. Templin. Mr. Ellis was general chairman of the Conference. Herbert Wishing was in charge of registrations. William B. Cleves arranged the exhibits. All business sessions were held in the Biltmore Hotel.

Saturday was devoted to demonstrations and outing. A display of Army motorized equipment was one of the principal attractions. Welding and hard facing were demonstrated at the Stoodly Co. plant in Whittier; metal spraying at Precision Engineering Co. plant, Los Angeles; and hard chrome plating by Hard Chrome Engineering Co., Los Angeles. Social activities consisting of sports, cards, barbecue supper and dancing were held at the Southern California Golf & Country Club. Carl Abell, Ethyl Corp.; Charles P. Sander, Kinner Motors; Gunner Edenquist, Kinner Motors; Foster Gruber, Douglas Aircraft; Mac Short, Vega Aircraft Corp., and George Tharratt, Adel Precision Products, were committee chairmen.

all installations. Each available material has its own field of usefulness, and it must be used within the limitations of that field if optimum bearing performance is to be obtained.

"When metals are freely available, five types of lining materials are used in Diesel-engine bearings, as follows:

"Tin-base babbitt of several compositions; in combination with back structures of steel, bronze, and cast iron.

"Lead-base babbitt of several composi-

tions; in combination with back structures of steel, bronze, and cast iron.

"Cadmium-silver-copper bearing alloy; in combination with steel backs only.

"Copper-lead mixtures; in combination with steel backs only.

"Connecting-rod bearings usually show distress before the main bearings are affected.

"It is a fact that the performance of an engine bearing may be unsatisfactory, even though all of the 'safety factors' are within the values herein defined. This will be due to faults in associated elements such as oil pressure, oil volume, oil distribution, oil viscosity, shaft or housing deflection, oil grooving, out-of-round saddle bores, etc. However, if the safety factors are within the values shown, it is a reasonably good guarantee that a successful installation can be obtained. Conversely, if the bearing factors are beyond the values shown, it is just as good a guarantee that a successful installation will be most difficult to obtain.

"At this time, it is no longer possible always to select the most suitable bearings for a given engine. The use of tin and cadmium is seriously restricted which re-



One corner of display of motorized equipment



Foster M. Gruber, chairman, Southern California Section

quires that the use of domestic metals such as lead and copper must be extended, and even these are not available in unrestricted quantities.

"The most likely substitute for tin-base babbitt is lead-base. If some of the existing literature on the subject of lead-base babbitts is taken too literally, the prospects are not so bright. For example, one authority says, '... tin-base metals are used where pressures are relatively high and temperatures may be considerably above atmospheric ... lead-base metals are used ... where the pressures are lower and temperatures not so high.'

"Actually, the situation with respect to the substitution of lead-base babbitt for tin-base in diesel- or gasoline-engine bearings is not at all gloomy at this moment. It is not possible to say that any lead-base babbitt can replace any tin-base babbitt under any and all conditions, but it is possible to specify certain lead-base babbitts, applied under defined conditions, which will replace certain tin-base babbitts and obtain improved performance. There has been a definite trend in this direction for several years and many automotive gasoline and diesel engines have been regularly produced with lead-base babbitt main, connecting-rod, and camshaft bearings. The reason for this trend has been improved performance.

"As an alternative for cadmium-silver copper or other cadmium-alloy bearings, the selections will lie between a lead-base babbitt and a copper-lead mixture. The choice is likely to be a compromise in which availability must take precedence over performance.

"It does not seem reasonable to expect that substitutions can be made in whole-

sale fashion without catering to the conditions under which the substitute materials may best work. This can be illustrated by the behavior of a selected group of bearing materials under operating conditions. It is not possible to present a detailed picture which covers all of the ramifications and variables of material composition, lubrication, loads, speeds, etc., but it is possible to examine the behavior of certain selected bearing metals which have been successfully used in diesel-engine production."

Templin on Renewing Parts

Ellis W. Templin, automotive engineer, general plant division, Los Angeles Dept. of Water & Power, read a paper on "Reclaiming and Renewal of Worn Automotive Parts." He discussed as the known and available methods: (1) metal spray (2) welding (3) hard facing and (4) hard chrome plating. He said all have been successful under certain conditions. He explained the methods, described the required

worn pistons, under-size parts and similar work can readily be repaired and made as good as or better than new by metal coating.

"Welding is an individual art. The experience necessary to be proficient in applying the process to different types of work varies. The U. S. government recommends 200 hr welding practice for beginners in work similar to that required in the ship building industry. Experience has shown that 200 to 300 hr of welding practice plus a study of metals has been sufficient to enable the welder to accomplish satisfactory results in the reclaiming and renewal of automotive parts.

"In hard facing, a metal surface, which due to its use is normally worn away rapidly, is protected by a layer of special alloy which possesses exceptional resistance to abrasion and wear. The process can be applied equally well to new parts before their first use or to old, worn parts. Experience has shown hard facing to be an easy and economical method for keeping equipment on the job without losing time ex-



(Left to right) Earl Marks, George Round, Dr. Ulric B. Bray, Major Leonard L. Beardslee, and Harley W. Drake took a prominent part in the Conference

equipment, discussed the desirable qualifications of operators and outlined the costs involved in completing the repair in a few typical cases.

Mr. Templin's observations included the following:

"Sprayed metal—either ferrous or non-ferrous—makes a much more efficient bearing surface than the solid metal due largely to its porous nature. When applied for corrosion resistance any thickness desired may be applied as opposed to plating which is limited. In many cases, defects in castings can be repaired by metal spray. Worn or scored bearings or shafts of any size, scored or corroded pump rods or shafts,

cessively for repair or replacement of worn parts.

"Successful hard chromium plating is dependent upon close adherence to several factors. The three types of factors involved are mechanical, metallurgical, and electrochemical. The mechanical factors deal with the proper masking of the part and the proper racking of the work. Considerable ingenuity is necessary for the design of the racks as well as knowledge and experience gained from actual contact with successful types. Metallurgical factors stress the absence of hardening strains in the base metal and suggest the advisability of Magnaflex or

(Continued on page 22)

West Coast SAE Caballeros equipped with their Gaucho hats plot to "take" San Francisco next

Clockwise, beginning with man with back to camera and in black suit—Wally Powelson, Robert Reinhard, Cecil Ellis, Fred Patton, Foster Gruber, chairman Southern Calif.; Russ Watson, Harley Drake, Charles Becker, Dr. Ulric Bray. All chairmen or past chairmen except Cecil E. Ellis who is vice chairman for T&M Southern California





Rubber and Large Plane Problems Clarified at Cleveland Meeting

TANGIBLE evidence that the automotive industry and its engineers are keeping their pledge for all-out war effort was demonstrated and displayed at the Cleveland Section's Regional Meeting, Hotel Carter, Aug. 21.

Strides in synthetic rubber development and effective uses of crude and reclaim rubber stocks . . . modern trends in multi-engine plane design . . . cooperation of industry standardization programs for war production . . . the engineers' job now and after war . . . these were the topics which attracted hundreds of Cleveland area engineers and executives to technical sessions and the dinner.

Mechanized war equipment, its component parts, and military applications of rubber made up one of the most interesting exhibits ever displayed at an SAE meeting. Full cooperation of industry and the military services was reflected throughout the exhibit, which was seen by more than 1200 people.

Paying tribute to engineers of the automotive and allied industries for their accomplishments in design and production of war equipment, Fred C. Crawford, president of Thompson Products, Inc., and principal speaker at the dinner, urged engineers to take a more definite place in "this make-believe world." He argued that engineers deal with facts, with realities; that they work with basic natural laws which are so essential to the nation at war and at peace.

This country, Mr. Crawford declared, has, is, and will continue to benefit from accomplishments of engineers. But, he asked, does the American public know this well enough to give them a real chance?

Engineers must be articulate, they must make themselves felt, they must "sell" realism and press economic truths on the American public, Mr. Crawford declared.

He told engineers that, despite the tremendous good it has done, the internal-

combustion engine is the most terrible weapon of the war, obsoleting all previous weapons. Engineers, he stated, have the tremendous obligation of designing and producing weapons that will get us out of the war. The one bright spot so far, he added, has been our ability to increase production and improve design of war equipment; to achieve mass production with changing design. We can and must do more, he declared.

Sharing the dinner program with Mr. Crawford were F. T. Macrae, executive vice-president, White Motor Co., and Mayor F. J. Lausche of Cleveland. Mr. Macrae reviewed the development of the half-track scout car as a typical example of long-range planning of military equipment embracing full cooperation of the army and of three different truck companies. Today, he said, the three companies are producing these vehicles in volume and every part is interchangeable.

Mayor Lausche declared that no group of Americans can lay claim to being most patriotic. We are all loyal at heart, he said, whether we be workers in the shops or executives guiding war production.



Fred Crawford, president of Thompson Products, Inc., was the principal speaker at the Banquet

John A. C. Warner, general manager of the Society, complimented the Cleveland Section on an outstanding meeting, terming it "one of the finest things ever done in the history of the Society."

Charles H. Miller, chairman of the Cleveland Section, opened the dinner session by giving special credit to the committee arranging the meeting, introducing: Harry F. Gray, its chairman, and committee members Robert Cass, R. S. Huxtable, Harry H. Hooker, W. S. Brink, R. F. Steeneck, and Tom O. Duggan. Other guests at the speakers' table were introduced by SAE Past-President Arch T. Colwell, who was toastmaster.

Rubber Symposium

A summary of how rubber experts and chemists are coordinating their activities to make best possible uses of rubber stocks on hand and to develop synthetics to meet wartime requirements was presented at the opening technical session by Dr. Otis D. Cole, Firestone Tire & Rubber Co.; C. W. Sanderson, The Goodyear Tire & Rubber Co., and George P. Loomis, The B. F. Goodrich Co.

First called upon by Chairman Miller was Dr. Cole, whose topic was Buna S, Buna N, and Butyl. In opening the symposium Dr. Cole stressed the fact that there is no absolute synthetic rubber as no material yet

developed is identical with natural rubber. The so-called synthetics, he said, would be more properly called synthetic elastomers by technical men.

Buna S and Butyl, he explained, come closest to replacing natural rubber in all normal use.

Briefly sketching the advantages of Buna S, the Firestone technician said that it most nearly meets requirements as to handling during manufacturing and as to properties in finished products. Most important, now, he said, is that raw materials are available.

Originally, Dr. Cole explained, physical properties of Buna S as measured by resilience, heat generation, and hysteresis measurements, were lower than natural rubber. However, he noted, ways have been developed to improve the product so that stocks equal to natural rubber are possible and may be used in most instances as replacement. Satisfactory tires have been made of Buna S, but are not in production because war needs come first, Dr. Cole stated.

One Buna S limitation was given as the time and effort required in training personnel, despite the fact that the same machinery is used in processing as for natural rubber.

Commenting on Butyl, Dr. Cole explained that the German-developed polyisobutylene or Vistanex had the disadvantage of not "curing" or vulcanizing like rubber. Standard Oil chemists overcame this by addition of a small amount of material, such as butadiene or isoprene, making it possible to vulcanize the material similar to rubber.

By simplifying the process of producing Butyl rubber, Dr. Cole explained, a product known as Flexon is produced. This is inferior to Butyl rubber and poorer yields are obtained, he said, adding, however, that simplicity of production makes it more available at present.

Butyl has the advantage of having high resistance to deterioration by ozone, light, and oxidation, and is very impermeable to gases, he said, also noting that it can be processed by existing machinery with possibly fewer difficulties than is the case with Buna S.

Dr. Cole pointed out that neither Butyl nor Flexon are compatible with natural rubber and cannot be mixed in stocks with other rubbers.

No entirely satisfactory tires have been made from Butyl, he said, but recent reports indicate that Butyl and Flexon have some possibilities for interim civilian tires where speeds are low and operating conditions are not severe.

Because of the incompatibility of these materials, the matter of their use for recapping has not been solved, Dr. Cole reported. He believes, however, that a solution to this problem may be possible.

Report on Thiokol

Highlights of the survey of the automotive and rubber industries united under the auspices of the SAE War Engineering Board were reported by Mr. Sanderson, in his paper on "The Use of Thiokol Synthetic Rubber Type N in The Interim Tire Program." He stated in his summary:

"(1) The most important thing we can do to keep the necessary passenger cars in operation is to conserve and protect the tires now in use.

"(2) The use of wood wheels, spring wheels, solid tires and mechanical contrivances is definitely not the answer to the interim tire problem. Passenger cars are

engineered for pneumatic tires and would be ruined in relatively short order if run on wheels of this type. Moreover, the amount of metal required even for the wood wheel types is high.

"(3) The field of substitute materials for pneumatic tires was surveyed. Several of the modern synthetic plastics have interesting properties and are rubber-like in that they are flexible. They are, however, lacking in the elastic and energy-absorbing properties necessary to make a tire. Moreover, practically all of these plastics have found very high priority war uses which are taking all the material available.

"(4) Two materials were recommended for this program, and it was urged that their development be pushed. One is Flexon, which has been covered by Dr. Cole—and the other was Thiokol Synthetic Rubber Type N, which is the subject of this report."

Types Analyzed

Mr. Sanderson explained that various forms of Thiokol synthetic rubbers have been on the market for some time and are widely utilized for articles required to be in contact with petroleum products. It has never been used for tires, as far as we know today, but is considered as a possibility in this emergency, he commented. N Thiokol, suggested as the type most suitable for tire use, has not been on the market, but was developed from the basic research work that had been conducted on the various modifications, he stated.

Factors determining selection of N Thiokol, Mr. Sanderson reported, are: (1) physical properties, (2) availability of materials, and (3) relative simplicity of manufacture. He pointed out, in addition, that the process is much less complicated than that involved in Buna S production and that requirements either for material or for plant equipment do not compete with the Buna S program.

Similar to rubber in that it is compounded with carbon black to give reinforcement and wear resistance, Mr. Sanderson reported, the compounding of Thiokol follows different lines in most other respects. The vulcanizing agent for rubber is sulfur, he said, whereas the "cure" for Thiokol is brought about by the use of zinc oxide. The thermoplastic properties are greatly reduced by heating, but they still persist to some degree. This, he noted, originally presented some disadvantages for tire use, but has largely been overcome by changes in compounding.

Mr. Sanderson also reported that Thiokol N tends to gas in curing, and for that reason molds must be cooled before pressure is released. He also spoke of the product's objectionable odor "which is not likely to prevent its use, particularly if the alternative is walking."

Tests on recapping with Thiokol N were reported by Mr. Sanderson. With ordinary design, using approximately 6 lb of Thiokol per tire, the average mileage at 35 mph is about 7000, which is about 20% as good as a first-grade tread stock or 75% as good as the all-reclaim stock now being used.

Other tests with Thiokol recaps using only half as much material and of a smooth-thread type 0.2 in. thick gave 4000 to 4500 miles at 35 mph, Mr. Sanderson reported. This, he explained, results in 50% more wear from a given amount of material and would permit the covering of more tires. The principal disadvantage, he said, is that new matrices would be required.

The production of a complete tire from

Thiokol N is still in the development stage, he said.

Presenting the final paper of the symposium, Mr. Loomis discussed "Crude Rubber and Reclaim."

"The lack of crude rubber and reclaim can delay the whole course of this war, if not seriously paralyze both military and supply services and all phases of civilian manufacture and transportation," was the definite statement of Mr. Loomis in decrying the many conflicting and ambiguous statements on the rubber supply situation that have left the American public confused.

To picture the present desperate situation, Mr. Loomis explained that, of the 9,000,000 acres of rubber trees under cultivation 52.9% is in Malaya, Ceylon, India, Burma, Sarawak, and British North Borneo; 39% in The Netherlands East Indies; 3.7% in French Indo China; 3% in Thailand; and 1.4% in Africa, Brazil, and Central America.

"One can see by these figures," he said, "that, with the Far East supply cut off, it is erroneous to maintain that the Western Hemisphere can supply our rubber needs. Assuming that vast sums of money were poured into South America, it would be years before even enough rubber could be produced to supply only the needs for passenger cars alone, between 150,000 and 200,000 tons." He explained that the yield per acre averages about 400 lb.

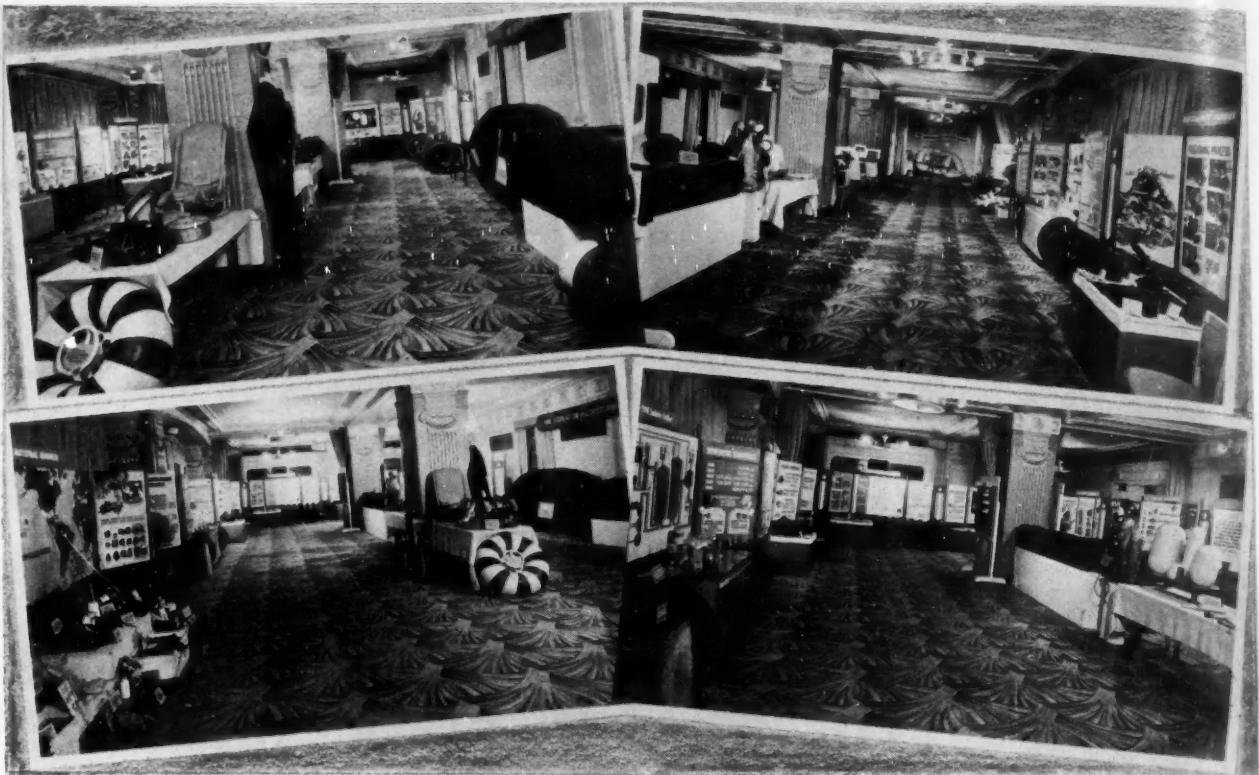
In explaining the various types and grades of rubber, Mr. Loomis explained that 97% of the crude rubbers formerly imported into the United States were plantation rubbers grown and prepared in the Far East. These are the superior grades which can produce the best articles at the lowest cost, he noted.

Guayule Evaluated

Guayule rubber, Mr. Loomis said, cannot be seriously considered in the interim emergency program, although it is to be cultivated in large acreage to provide future protection against loss of supply. He spoke of the experimental plantation leased by the U. S. Rubber Co. near Yuma, Ariz., where research virtually extends Edison's investigations, which covered more than 17,000 plants. Dr. McGavach, in charge of the research, he explained, has stressed the term "useful rubber" and by means of X-ray equipment can show difference between good and poor rubber produced from various plants.

"Really to accept the view that reclaim is a strategic interim material," Mr. Loomis stated, "one has only to review the accomplishments of the industry through its various technical committees working with the War Production Board."

Although passenger-car tire manufacture has been stopped for the most part during the emergency, he said, the industry has continued to develop tires containing various large percentages of reclaim throughout the whole tire. One hundred per cent reclaim tires can be made with a minimum of manufacturing defects, and tests have given them a rating of 40% of the average life of a pre-war first-line tire. This rating is equivalent to 8000-10,000 miles if speeds are kept below 40 mph. Large truck tires, Mr. Loomis reported, are now being manufactured with treads containing from 8 to 25% reclaim while smaller sizes with as much as 30% of reclaim in body plies and 15% to 25% in treads are operating on highways. If not overloaded and if speeds are kept under 40 mph, these tires give fairly satisfactory service, he said. He also



The combined exhibit of the rubber industry shown was an important feature of the military and industrial exhibits. It included a comprehensive display of natural and synthetic rubbers, and war products requiring rubber

Exhibit an All-Day Feature

A MILITARY and industrial exhibit which crowded two large rooms with diversified displays, attracted hundreds throughout the day.

Japanese and German engines taken from shot-down enemy planes were displayed by Wright Aeronautical Corp.

Bombs, shells, mobile fighting vehicles, aircraft engines and parts, together with a variety of displays showing production methods being used to accelerate war production, drove home the fact that automotive engineers are truly doing their job for the safety of democracy.

The rubber companies of Akron cooperated in presenting the most comprehensive exhibit of natural and synthetic rubbers along with a complete display of war

products in which the use of rubber is necessary.

The list of exhibitors is as follows:

Aluminum Co. of America
American Bantam Car Co.
Bendix Products Division, Bendix Aviation Corp.
Bendix-Westinghouse Automotive Air Brake Co.
Bishop & Babcock Mfg. Co.
Cleveland Graphite Bronze Co.
Cleveland Pneumatic Tool Co.
Cleveland Tractor Co.
Cleveland Ordnance
Eaton Mfg. Co.
Elwell-Parker Electric Co.
Erie Proving Ground (U. S. Ordnance)
Fafnir Bearing Co.

General Electric Co.
General Motors Corp. (Cleveland Diesel Engine Division)
International Piston Ring Co.
Leece-Neville Co.
Lincoln Electric Co.
Lord Mfg. Co.
Ohio Crankshaft Co.
Pump Engineering Service Corp.
Ravenna Ordnance Plant
The Rubber Industry Combined Exhibit
Standard Oil Co. (Ohio)
Thompson Products, Inc.
Towmotor Co.
Weatherhead Co.
White Motor Co.
Willard Storage Battery Co.
Wright Aeronautical Corp.

spoke of all-reclaim tubes in smaller sizes, and part-reclaim inner tubes that can render useful service.

Summarizing his paper, Mr. Loomis stressed two main points: (1) that it is important to realize what types of rubber are most useful—not in 5, 10, or 15 years—but now; that all rubber is not the same; (2) that reclaim can play an increasingly important part to help keep cars and trucks on the roads and to stretch the rubber stockpile.

Robert Cass was in the chair for the late afternoon session on "Modern Trends in Multi-Engine Plane Design," which immediately followed the rubber symposium. The paper was presented by Robert J. Minshall, president and general manager of Pump Engineering Service Corp.

Holding his discussion to airplanes which have three or more engines, Mr. Minshall stated that, first, the reason for multiplicity

of engines is safety, and second, design problems inherent in the airplane often make it impracticable to install extremely large engines; hence the requirement for three or more.

Mr. Minshall pointed out that failure of one engine in a four-engine airplane still permits operation on 75% of its original power, usually quite in excess of its normal cruising requirements. In nearly every case, modern three-engine airplanes would require installation of the third engine in front of or behind a large central fuselage, Mr. Minshall observed, noting that the efficiency of these centrally located engines has always proved unfavorable due to interference of the fuselage. Hence, he said, considering the safety factor: the four-engine airplane with engines mounted in neatly faired nacelles along the leading edge of the wing appears to be the optimum choice.

Mr. Minshall voiced his opinion that the major excuse for six or eight engines on an airplane is lack of powerplants of sufficient size to justify using four engines. He did note, however, that a six- or eight-engine installation might also be justified from the standpoint of the airplane's overall design due to propeller-size restrictions and the balance of an airplane for a given configuration.

The importance of the cowl around the engine and of care in fairing the nacelles into the wings was stressed by Mr. Minshall. He noted that the four nacelles contribute about 30% of the drag of the airplane. When the speed of an airplane reaches the speed of sound, it was stated, the compressibility wave is set up by certain portions of

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SAE NOMINEES FOR 1943...

for:

President Mac Short

Vice President of Engineering,
Vega Aircraft Corp.

Treasurer David Beecroft

Bendix Products Division,
Bendix Aviation Corp.

Membership on SAE Council, term of 1943-1944:

N. P. Petersen

President, Canadian Acme
Screw & Gear, Ltd.

C. G. A. Rosen

Director of Research, Cater-
pillar Tractor Co.

J. C. Zeder

Chief Engineer,
Chrysler Corp.

CONTINUING on the Council for 1943 will be the following men who were elected for a two-year term at the beginning of 1942: **W. S. JAMES**, Chief Engineer, Studebaker Corp.; **J. V. SAVAGE**, Superintendent, City of Portland, Municipal Shops & M. V. Inspection Station; **T. P. WRIGHT**, Assistant Chief, Aircraft Section, War Production Board. Serving on the 1943 Council as Past Presidents will be **A. W. HERRINGTON**, Chairman of the Board, Marmon-Herrington Co., Inc.; and **A. T. COLWELL**, Vice President, Thompson Aircraft Products Co.

Vice Presidents:

Aircraft John G. Lee

Assistant Director of Research, United
Aircraft Corp., Research Division.

Aircraft-Engine S. K. Hoffman

Chief Engineer, The Aviation Corp.,
Lycoming Division.

Diesel-Engine Grover C. Wilson

Fuel Research Engineer, Automotive &
Aircraft Department, Research & De-
velopment Laboratories, Universal Oil
Products Co.

Fuels & Lubricants W. M. Holaday

Automotive Research Engineer, Socony-
Vacuum Oil Co., Inc.

Passenger-Car R. E. Cole

Vice President of Engineering, Stude-
baker Corp.

Passenger-Car-Body G. J. Monfort

Engineer, Body Division, Chrysler Corp.

Production Arnold Lenz

Assistant Manufacturing Manager,
Chevrolet Motor Division, General
Motors Corp.

Tractor & Industrial C. G. Krieger

Agricultural Engineer, Ethyl Gasoline
Corp.

Transportation & Maintenance A. M. Wolf

Automotive Consultant

Truck & Bus E. W. Allen

Coach Engineer, General Motors Truck
& Coach, Division of Yellow Truck &
Coach Mfg. Co.

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the airplane which requires energy far beyond that required by the normal drag. The drag of such protuberances as the wind-shield, radio masts, air intakes, and so on, immediately depart from the old law of drag varying as velocity squared and, due to this compressibility wave, tend to approach the condition of infinite drag, he explained. It is, therefore, mandatory, he emphasized, that the curvature of all surfaces exposed to airflow be of such nature that they do not cause the air to be accelerated beyond the speed of sound.

With the advent of extremely large airplanes, Mr. Minshall predicted, powerplants of special design, permitting complete housing within the wing and a better overall aerodynamic efficiency will be forthcoming. He also noted that the efficiency of the propeller behind the trailing edge of the wing has been shown to exceed that of tractor propellers.

Concerning airfoils, he reported that every effort is being made to produce airfoils which will maintain the laminar flow over the leading edge as well as the trailing edge of the airfoil. "In my opinion," he stated, "the airplane of the future will be a combination of the so-called laminar flow of the airfoil, and one in which a high lift coeffi-

cient can be obtained by slight modification of the forward contours."

Fuselages of the future, he predicted, will no doubt appear, in many respects similar to that of the Boeing "Stratoliner."

Mr. Minshall stated that he is a strong adherent of the single fin and rudder combination for tail surfaces against other combinations, arguing that it gives the pilot better control should engines on one side fail in take-off.

Reviewing the comparative advantages of hydraulic and electric controls, he stated that hydraulic controls have the advantage of ease of installation and may have the advantage of weight saving, especially if high-pressure hydraulic systems are used. Although electric controls are also easy to install, he said, they require the addition of mechanical connections to the airplane parts to be operated and hence are a little heavier at this time. From a military viewpoint, he commented, electric controls may have less vulnerability.

Hydraulic boost controls are now being used with a high degree of success, Mr. Minshall stated, predicting that aeronautical engineers must eventually look forward to designing an airplane which will be impossible for the pilot to fly without the aid of some sort of a boost in the control system.

T&M West Coast Meeting

(Continued from page 17)

Zygly (5) testing before repair work is applied. It is believed that the most important of the electrochemical factors is the anodic chromic acid treatment of the work prior to plating. Unless an anodic chromic acid treatment or an anodic hydrochloric acid pickle is used the result will be peeling, chipping or cracking of the chromium plate, either as the work comes from the tank or in subsequent service. Optimum solution and electrical conditions are important, but it is the anodic chromic acid pickle that insures uniform success from the standpoint of adherence of the plating to the base metal."

Mr. Savage started discussion of the two papers rolling when he commented: "They told us to build up our parts with metal, then they took the metal away from us and gave us substitutes. Now they take the substitutes away and tell us to increase the efficiency of our vehicles, to conserve their use and at the same time hand us a real problem. Who's got the answer?" Nobody seemed to have it.

The following summarizes answers to miscellaneous questions from the floor:

Bearing troubles will result from use of heavy-duty compounded oils unless filters are clean.

The Army is developing a porous type of bearing made so that porosity can be controlled. Aluminum-tin is being used and some work has been on cast iron.

The Army has attempted to pre-coat copper-lead bearings. Silver is a desirable additive but it is too hard for crankshafts.

Thickness of bearing lining metals is going down.

A shaft wears more with thin than with a little heavier lining.

Change bearings oftener when lining is thin.

Reversing con rod bearing shells (upper to lower) after 30,000 miles has added bearing life.

Relative tensile strength of sprayed metal is about 10 per cent that of the original wire. Hardness is about same as when heating and giving a short draw—carbon content is up.

Metal spraying brake drums has been tried but is not very successful to date—experiments are continuing.

There's a wide spread need for reclaiming die cast parts by spraying—information is lacking.

Chromium plating rings to reduce cylinder wear has proved advantageous on air-cooled aircraft engines but experience with automotive engines is lacking.

It was at the Transportation Banquet in the evening that the Office of Defense Transportation was put under fire. Roy Long, field manager of the Los Angeles office ODT, Division of Motor Transport, was the guest speaker. Foster M. Gruber, chairman of the Southern California Section, SAE, was toastmaster. Charles F. Becker, supervisor of development, Tide Water Associated Oil, was chairman.

In his opening remarks, Mr. Gruber said: "We've heard so much that this is a war of production, that it's a war of machines

rather than men, of materials rather than munitions—we hear so much about what other industries are doing—that we lose sight of the fact that this is a war of transportation. But you can't have a war of transportation without maintenance. The biggest problem is not the transformation of hydrocarbons into horsepower, but keeping those hydrocarbons on the job. It may be a war of ships and airplanes and guns and tanks, but it still takes transport to get them there and maintenance to keep them going.

"But transportation and maintenance in themselves are not enough. In a total war, when every vehicle is a part of war transportation, the keys are education of personnel to gain the most out of the least; organization and operations, to ensure smoothness of function; simplification, standardization, interchangeability, so that the transport lines carry what is essential to the war effort.

"The SAE has been working in close cooperation with the armed forces and other organizations interested in bringing order out of chaos. Our work has been the simplification of tools and methods to achieve quantity production in the shortest possible time, and to keep that production rolling once it gets in the field.

"Technicians, engineers, service men who are engaged in war work usually lack the proper perspective necessary to see the value of their own effort or to recognize the importance of their work. But war, unfortunately from the ethical point of view, accelerates the use of new ideas, new designs, new materials, new methods, and we who remain after the war reap this benefit. Not until then do we receive any public recognition of the part we play in the war itself and in the peace we hope will last."

Cutting Transport Waste

"Twenty-five years ago, we were fighting the first World War," said Mr. Long. "In that war, as in all other wars, transportation was a prime factor in victory or defeat. As usual during wars, production is stepped up, the flow of raw materials must be speeded and without some form of regulation congestion inevitably results."

The speaker reviewed the advent of United States participation in this war, creation of the Office of Defense Transportation, formation of its departments, the sudden developments in the rubber situation and the resultant issuance of General Orders by ODT to curtail the use of motor equipment as a conservation measure.

He told about formation of local committees under the setup, their assistance to him and stated that as the direct result of cooperation on the part of carriers the reduction in operating miles has been great. A check of 75 representative firms in diversified industries shows an over-all reduction of 28%. Civilian operations show a saving of 37% but greatly stimulated activities in essential industries, as much as 300% in some fields, cut the over-all to the stated figure.

Declaring a 30% reduction in mileage will not be enough, according to present estimates, Mr. Long said: "This particular job falls upon you gentlemen who are primarily responsible for the maintenance and conservation of equipment." He stated that the conservation program as represented by the U. S. Truck Conservation Corps and the descriptive booklet "Keep 'Em Rolling" is largely the work of the SAE.

"The greatest fifth column in the United

1919 Vision

"Let us as Americans and engineers give serious consideration to the fact that, if another unfortunate war should arise, the initial and perhaps the final advantage will lie with the nation which has attained the highest development in aeronautics. Our country, with its broad areas and vast industrial development, can obtain the lead more easily than others."

—T. S. Kemble (M '11), discussing "The Liberty Aircraft Engine," by J. G. Vincent, p. 400, May, 1919, SAE Journal. At present Mr. Kemble is connected with White Motor Co.

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SAE NATIONAL FUELS & LUBRICANTS Meeting

OCTOBER 22-23

TULSA HOTEL, TULSA, OKLA.



★PROGRAM★

THURSDAY, OCTOBER 22

Morning Session

William F. Lowe, Chairman

The Use of Petroleum Products in Aircraft

— Frank D. Klein, Standard Oil Co. of N. J.

Requirements of Aircraft Oil Servicing Equipment for the War Effort

— Charles W. McAllister, Sinclair Refining Co.

Afternoon Session

T. B. Rendel, Chairman

Gasoline Engine Exhaust Odors

— J. J. Mikita, Harry Levin, and H. R. Kichline, The Texas Co.

Re-refining of Aircraft Engine Oils

— Gilbert K. Brower, American Airlines, Inc.

Evening Session — Dinner

C. M. Larson, Chairman

War on Wheels — A. W. Herrington, President, SAE

FRIDAY, OCTOBER 23

Morning Session

Frank A. Suess, Chairman

Bearings and Bearing Corrosion

— Leonard Raymond, Automotive Laboratory, Tide Water Associated Oil Co.

New Methods for the Evaluation and Recording of Piston Skirt Deposits

— H. R. Luck, T. A. Rogers, and A. G. Cattaneo, Shell Development Co.

Afternoon Session

Leonard Raymond, Chairman

Correlation of Laboratory Oil Bench Tests with Full Scale Engine Tests

— C. W. Georgi, Research Laboratory, Quaker State Oil Refining Corp.

General Discussion

Evening Session — Dinner

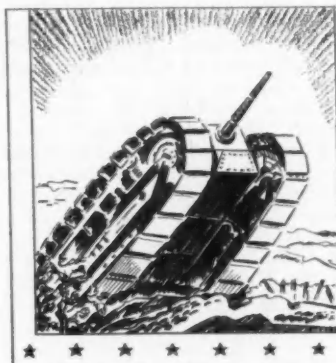
Arch L. Foster, Chairman

Debate — Student Representatives, Oklahoma University and Oklahoma A & M

"Resolved: That the 2-cycle diesel engine is to be preferred when compared with the 4-cycle diesel engine for automotive purposes"

Affirmative — Oklahoma University

Negative — Oklahoma A & M College



(Concluded from page 22)

States today is the feeling that something is going to happen, something turn up to alleviate the situation," he said. "Let me assure you there is nothing on the horizon today that indicates anything possibly can happen to offset or counteract the necessity for conserving equipment. Your organization helped make the program and the actual putting it into effect is largely up to you. We've made a big reduction in mileage, we've curtailed our operations but the successful completion is up to you."

Chairman Becker lowered the bars when he asked if there were any questions or comments on Mr. Long's remarks.

John L. S. Sneed, Jr., superintendent of maintenance, Consolidated Freightways, Portland, a member of the Oregon Section fired the first shot. He declared the U. S. Truck Conservation Corps movement lacks impetus and force and wanted to know what ODT is doing to carry it out. Among other things, he wanted to know what ODT is doing to get the support of labor unions back of the Corps.

Mr. Long said ODT will put a crew of stimulators into the field and there will be national publicity. The labor phase he branded a real problem and expressed confidence in labor doing its part.

Harley W. Drake, superintendent of equipment, Pacific Highway Transport, Seattle, declared the pledge portion of the program is "hokey."

"The individual is not conscious of that which is necessary to win the war—not willing to go all out," asserted Mr. Drake. "Management is doing everything possible to conserve equipment but if the driver doesn't care, management has no control. Our problem is one of humanics. The pledge deal is hokey. This is no time for pledges but a time for action. We've got to tell them what has to be done. We don't get any place trying, so that's where ODT can come in and help us. Inspections and more inspections. We make all we can and now the government is adding another. Let's have something from ODT on the need for discipline and obedience to orders."

Peter Glade, Northern California Section, transportation superintendent, Purity Stores, Oakland, said that company is closing stores to cut down mileage—has cut mileage 30%—but labor is not willing to cooperate.

Sherer G. Culver, vice-chairman for T&M, Northern California Section, said the Key System, Oakland, has established skip stops and discontinued parallel service (rails and buses) but was running 27,500 miles a day in January and ran 57,100 daily in July. "That's not cutting down mileage, but what can we do about it?" he asked.

Robert Reinhard, Golden State Co. (dairy products), and Louis Erickson, Adohr Milk Farms, both Los Angeles, told what their companies have done to reduce mileage and expressed the opinion the ODT program is working advantageously.

The second day of the Conference was known as "Army Day." The Operations and the Lubricants sessions were combined. Harley Drake was chairman, Earl A. Marks, Portland, chairman of the Oregon Section, was technical chairman, and Dr. Ulric B. Bray, petroleum consultant, was conductor.

Driver Training Stressed

Major Leonard L. Beardslee, automotive officer, QMC, Southern California Sector, USA, formerly superintendent of shops and equipment for Los Angeles County,

read a paper on "Training of Drivers for Army Motorized Equipment."

The driver training program in use by the Southern California Sector, USA, requires approximately 100 hr to complete. The preliminary course consists of six periods: (1) responsibility and general duties (2) winch operation and loading (3) map reading (4) driver's part in preventive maintenance (5) driver reports (6) written, oral and practical examinations in all subjects. This is followed by an advanced course with the following periods: (1) lectures and demonstrations on use of controls (2) starting and warming engines (3) simulated operation of vehicle (wheels on blocks) (4) actual driving—a four-section period. Drivers who complete the courses successfully are given a badge of honor, similar to that awarded a sharpshooter. The badge is revoked for causes, one of which is traffic violations.

Army Maintenance Methods

A paper, "Plans for Maintenance and Repairs of Motorized Equipment Under Army Combat Conditions," prepared by Major Robert E. Townsley, Auto Officer, USA-QMC, was read by Lieut. S. W. Burton. He said the operation of vehicles is inseparable from maintenance and the Army has contrived five echelons of maintenance. Each has a separate and distinct function which he described as detailed in official manuals.

There was no discussion of these papers.

With Sidney B. Shaw, automotive engineer, Pacific Gas & Electric, San Francisco, as chairman of the Maintenance Session, and the Army having done a thorough job with the subject, "Lubrication" got under way with an extemporaneous talk by George A. Round, a nationally known authority and Army consultant, who came direct from the desert training activities to participate in the Conference. His remarks were augmented by extracts from the paper prepared for the SAE Summer Meeting, which was printed in the July, 1942, SAE Journal.

Round Talks Lubrication

Mr. Round's most emphasized and impressive statements included:

"Any company that has an opportunity to supply products to the Army, should ask itself this question, 'Would I like to have my son in a tank in Libya with his life dependent on my products?' We've got to realize we're playing a game with very high stakes. Our necks are on the block."

"In this war, men can get along without food and water for days but when the army runs out of gas it stops right there. The reliability of equipment depends very largely upon petroleum supplies. These amount to at least 45% and sometimes as high as 70% of the total. If they could be simplified to one fuel and one grease, it would be ideal. We're working to this end. Vehicles formerly requiring 87 octane fuel are now being reduced to 80 and other vehicles to 72 octane. Vehicles are giving very little trouble from vapor lock with a temperature on the sand dunes of 122 F. Diesel fuels may be changed to one grade that will be satisfactory under all conditions. May go to lighter fuels."

"Federal specifications for motor oils are a headache. Revised specifications for lubricants have been issued," Mr. Round stated, "since my original paper was prepared. Universal gear oils have been specified for all types. Steps have been taken by

Army to get federal specifications for chassis lubes with some teeth in them. Experiences have been disastrous—entire tank engines have had to be taken out every 48 hr because a clutch pilot bearing burned out due to poor lubricant. The program is not complete. The work is not done."

Questions from the floor met with these answers by Mr. Round: "On the desert, the Army drains crankcases every 6,000 miles, drains when hot and fills with cold oil; use of mixed oils results in same results as are to be had from each kind itself—no indication of adverse results from mixing; the Army does not and will not reclaim oils—reclaiming heavy-duty motor oil removes additives; impractical to reclaim or re-refine on battle field; if water mixes with fresh oil, you'll get rusting; when gears are washed in gas or naphtha, dip them in oil immediately or they will rust; there is no satisfactory method for venting gear boxes unless provision can be made for frequent servicing of vents; an attempt is being made to work out relief from over-speeding engines on down grades—now looks like tachs are the best bet."

Friday evening was billed on the program "Army Mess and Talk." The billing was correct. Foster Gruber was toastmaster, Robert Rowley, engineer general plant division, L. A. P. & W., chairman of military affairs committee, SAE Southern California Section, was chairman. Speaker was Brigadier General V. E. Prichard, in command of mechanized forces in desert training, USA, observer to Great Britain. His paper and comments, especially the comments, proved the top attraction of the Conference. He pulled no punches and delivered many.

Here are a few of his wallopers:

"Civilian advisers. If they will stay in the place they belong and do the job intended, they will be of service to us. I won't have them as commissars. It won't work and that is the danger of trying to mix civilians and soldiers in war times. We've got to lick men, that is our ultimate aim. We'll do the fighting and don't need anybody to try to tell us how to do it."

"The field soldier takes what's given to him and does his best to make it go. Your job is to see we receive your honest thoughts and efforts, keeping in mind the uses to which we are going to put that equipment. When we do not receive your honest thoughts and best materials we have grief and plenty of it. We've had to make a major modification in over 700 vehicles."

"Before you undertake a job that requires use of motors, you want to know what it has to do. Same with us. We have to make vehicles operate in all parts of the world under any and all conditions. We must know about changes being made in new vehicles before we get the vehicles. We must have all of the data in advance."

"If you don't give us the parts, we don't roll. We've had \$50,000 worth of vehicles tied up for lack of a 40c part."

"Those of you who have anything to do with designing vehicles must remember we have to have men to use them. No man over 150 lb can get inside of one of those new tanks. You're going to have to breed a race of pygmies to run them."

"You've heard a lot about how the taxicab army saved Paris. It didn't. It was just an enormous traffic jam. Drivers didn't follow the prescribed route out of the city, tried to take short cuts, got all snarled up with the result about 1,000 of them got their loads of soldiers to the front instead of the 15,000 you read about."

Cancellation of \$ Millions Of War Contracts Due:

1. To Save Materials
2. To Balance Production

SWEEPING cancellations of large and small armament contracts will soon be made to bring the nation's production program into alignment with itself, and to make the best possible use of critical materials.

Despite the President's warning that U. S. war production has only passed the halfway mark, millions in arms contracts have already been cancelled.

Significant facts:

- High Army and Navy officials have satisfied themselves that shortages, as reported by the War Production Board, are desperately serious, and are cooperating more closely than ever before with the conservation experts of WPB.

- Army and Navy engineers are making rapid advances in selling top officers on their several programs of substitution.

- Each week more WPB officials are becoming indoctrinated in respect to materials scheduling, realizing that control of physical flow of metals is essential.

Cancellations are already beginning in these groups of arms products:

- **Ammunition.** Faster-than-estimated production resulted from these factors: 1. When production engineers of industry got busy on Arsenal prototypes, retooling and handling were developed on a mass-production basis, and 2. Deep-drawing of steel shells for the Army contracts saved millions of manhours, multiplied some of the output estimates by as high as 15 times.

- **Substitutions.** Shortages in steel will require many products to be redesigned, and contracts will have to be cancelled pending changes.

- **Design changes.** In view of information obtained from the fighting fronts in respect to the effectiveness of new weapons, a large number of contracts will be cancelled pending redesign. These items are almost all military secrets.

Tucker Heads WPB In Canada

Joe Tucker is the director of the new Canadian Division, WPB at the Department of Munitions and Supply, Ottawa. This step is toward coordination of munitions production, materials distribution and priorities controls in the U. S. and Canada, placing firms engaged in war production on both sides of the border on an equal footing for distribution of materials.

Canadian companies engaged in war production are eligible to receive priorities assistance in obtaining materials from the U. S. under the Production Requirements Plan or, upon special authorization, under the various preference rating orders applicable to similar American companies.

Mr. Tucker was formerly vice president and general sales manager of the Oliver Farm Equipment Co.



Auto Employment At All-Time High

AUTOMOTIVE employment is over the 800,000 mark and is devoted almost entirely to war production, but is only 58.8% of its anticipated peak, a study made by the Automotive Branch, WPB, discloses. Average employment in 1939 was 394,000 and in 1940 reached 448,000.

Reports from 242 companies, operating 686 plants and comprising 94% of the industry, showed total wage earners in July of 823,888. Wage earners in these plants have increased from 697,355 in April to 751,672 in May and 791,753 in June.

These companies have set an anticipated peak of 1,401,856.

Shipments and man-hours for June from these 686 plants were nearly \$700,000,000, of which 91.7% were war goods. In June, 90.9% of the man-hours were on war work.

"The percentage of war goods and hours on war work have increased steadily from month to month and the July figures may be expected to show additional increases," said R. L. Vaniman, chief of the branch.

"These figures show that the job of conversion in the automotive industry is near completion but that a big job remains to bring employment and production to the anticipated peaks. To meet the anticipated peak of employment will present a definite labor supply problem, particularly in some areas such as Detroit. This problem has been foreseen and steps have been taken to meet it when the pinch comes. An illustration of this was the recent voluntary registration of women available for war work in the Detroit area.

"This registration, conducted by the Detroit Region WPB and the U. S. Employment Service, resulted in the registration of more than 300,000 women, of whom 170,000 reported their availability for work in war plants. Many have had factory experience.

"Other problems of production such as an

even flow of materials, further distribution of contracts from overloaded plants and the combating of bottlenecks as they appear will have to be battled continually in order to permit the continued steady advance of war production in the automotive industry to its peak."

The 823,888 wage earners in the 686 plants, were distributed as follows:

Auto manufacturers (9 companies, operating 195 plants) 436,969;

Truck companies (34 companies, operating 42 plants) 33,962;

Parts companies (199 companies, operating 449 plants) 352,957.

Of the total number of wage earners, 567,446, or 69%, were classed as production workers.

Substitutions: Huge Materials, Manhours Savings Are Being Made

Under the direction of Major-Gen. T. J. Hayes, chief of the industrial section, Army Ordnance Department, civilian and Army engineers are cutting millions of manhours from arms production, and saving tens of millions of dollars in cost of armament.

The program:

- Suggested changes in design, submitted by contractors, are studied by staff engineers assigned to Ordnance District chiefs, and in Washington. These suggestions, if practicable, are approved by the Ordnance Department, samples are made and tested. If successful, changes are made in drawings.

- When a contractor is seeking a contract, he is asked to study the drawing with view of suggesting some quicker-than-normal method to manufacture the item, and suggest substitutions in materials.

Examples of savings:

- A manufacturer suggested a stamped clip instead of a wingnut assembly with two

washers. These clips are made 150 times faster, and on one order 8.7 carloads of steel were saved.

• Another manufacturer suggested a stamped lug to take the place of a machined forging. On a lot of 100,000, 17,000 lb of steel and 8000 machine-tool hours were saved.

• An automotive company designed a stamped trigger plate for a gun. The forging it replaced required 29 machine operations. Now only seven blanking, forming, and welding operations are required.

• Thirty-five pounds of aluminum casting was used for an engine supercharger, but this was changed to welded steel stampings. Enough aluminum was saved by this substitution to build 500 fighter planes, the Army estimated.

A booklet, "Tremendous Trifles," showing some of the progress in materials and methods substitution, is available from local Army Ordnance offices.

SWPC+SWPD, WPB Clash With FUD

SPREAD of war work, an early tenet of the War Production Board and its predecessors, which lost out to a more realistic view that arms had to be made fast, is again in the news.

Lou Holland, deputy chairman of WPB and head of Smaller War Plants Division of WPB, is also chairman of the Smaller War Plants Corp. set up by the Murray-Patman Act.

Hampered because the SWPC was a foster child of WPB by act of Congress, the new division puts this effort under WPB auspices and under the direct control of Chairman Donald M. Nelson.

Identical as to objectives, the two agencies are entirely separate. This official statement made by Mr. Nelson was calculated to "clear away" the general confusion.

Freely described by observers as a political sop to small business men, both the Smaller War Plants Corp. and the Smaller War Plants Division of WPB controvert the policies of the Facilities Utilization Division which is to find facilities for Army and Navy contracts without regard to the size of the facility. FUD saw the light of day with the recent "realignment" of WPB and is being used by the Army and Navy.

Prediction No. 1: In view of huge contract cancellations (see "Cancellation of \$ Millions Of War Contracts Due," p. 25) these smaller plant organizations with a single objective and a single boss, will fail in their purpose.

Prediction No. 2: The Army, Navy and Maritime Commission will continue to use FUD - even if its able and diligent personnel are absorbed by the services. Important military leaders told the SAE Journal that this is clearly a function of the Army & Navy Munitions Board, and feel that WPB and Congress have backtracked. The experiences of the Contract Distribution Division of OPM and later WPB has proved to them the error of efforts directed to spreading war work.

The realistic approach, they appear to agree, is to get arms built by whomever can build them the fastest, and with the

Government Storage Rules:

For Cars and Trucks

MAINTENANCE of the 500,000 passenger cars and commercial vehicles now frozen in the hands of producers, dealers, distributors and other agencies was announced by WPB, OPA, Department of Commerce, and ODT, the four government departments in charge of wartime transportation.

Eighteen maintenance operations are set up to be followed in caring properly for stored vehicles:

- Washing all vehicles,
- Moth-proofing upholstery,
- Draining engine oil and gasoline tanks,
- Removing spark plugs,
- Sealing engines to avoid damage from air moisture,
- Removing and storing batteries,
- Draining cooling systems, and
- Jacking up vehicles to take the weight off tires.

Requisitioning powers of WPB may be resorted to if it is found that the mechanical condition of any vehicle has been impaired or will become impaired due to failure to comply with these maintenance standards.

WPB Conservation Order M-216 and OPA Amendment No. 4 to Revised Price Schedule No. 85 have been issued to implement the program, which is designed to assure that all passenger and commercial vehicles now in storage awaiting rationing are kept in good condition.

'Frozen' Vehicles Must Now Be 'Dry Stored'

Buried down under more than 1600 words, a short sentence in the order on "Conservation of New Automotive Vehicles Subject to Rationing by Federal Agencies" (M-216, Aug. 29) has bad news for most manufacturers, dealers, and distributors. The sentence:

"All reserve vehicles must be stored indoors." This is amplified by a number of detailed instructions making the bad news worse.

Millions of feet of clean, dry storage space must be found for several hundred thousand new cars, trucks and other motor vehicles now parked in the open.

Form PD-641 is to be used to report stocks.

Standards of maintenance operations have been issued to the industry.



least amount of waste of raw materials.

Here the political and engineering philosophies clash: Odds are on the engineering point of view.

Recovering Copper

Nearly one-half of the 1939 automotive use of copper has been reported to WPB by more than 14,000 firms. Of the 55,000 tons, about 15,000 tons of copper and copper base alloys have been allocated from "immobilized" stocks to war production. About 1200 tons were added to the nation's stockpile.

Hundreds of automotive companies have been able to keep up production schedules by acquiring stocks of copper and alloy "frozen" by WPB orders.

Manufacturers needing copper or alloys are requested to get in touch with their local WPB offices, or the Copper Recovery Corp., 200 Madison Ave., New York, a subsidiary of the Metals Reserve Co. of the Reconstruction Finance Corp.

OPA Ups Mexican Silver

Silver bullion now may be imported from Mexico at an increase of from 35.375 to 45¢ per troy oz, OPA announced. This is to permit Mexico to levy a special emergency tax of 7¢ against the metal. An increase of 9.675¢ per oz was granted for silver content in imported concentrates and ores from Mexico, also.

Trademark Ban Issued by WPB

HISTORICAL because it is clearly a sign of the times, a new WPB order (Amendment No. 2, L-52, Sept. 2) eliminates nameplates from a manufactured product.

The bicycle industry output is limited to 10,000 a month, and is concentrated in two plants.

"W" with a serial number will stand for the proud name of Westfield Mfg. Co., and "H" with a serial number will replace the well known Huffman Mfg. Co. trademark.

These two factories were chosen by WPB upon the Bicycle Industry Advisory Committee's recommendation for the "concentration of production" or "nucleus plan" initiated by WPB several months ago.

Strong sentiment in WPB continues that all civilian products carry an "emergency" trade mark, such as "Victory," when manufacturing is thus concentrated.

WPB officials are watching design projects of the Army Ordnance Department to see if resistance to "standard type" vehicles, to be made jointly by competitive factories, wanes. Should such a program be adopted, spokesmen for government-controlled civilian industries will have a powerful precedent to push the "standard product" program supported by some WPB executives.

They're Saying in
Washington...

Valley In The Curve

MANY men are discussing many things in Washington these days, but more appear to be thinking about production engineering in our war manufacturing effort more than ever before.

There's a dip in the armament production curve which threatens to deepen into a disastrous valley. "Materials shortages" are to blame, but this needs explanation to those who wonder at the huge difference between steel mill output and tons of armament—for example.

Those who have been forced into the "black market" to get materials on high priority armament products are wondering also.

And the WPB executives who still hope that priorities, the Production Requirements Plan, its offshoot LUMP, and other "plans" will save the day, have begun to wonder.

Essentially, the materials problem which is becoming so desperate is aggravated by lack of engineering in high places in WPB. And one of the important factors in production engineering has always been the proper scheduling of materials, and following up constantly to see that the right amounts get to the right machines at the right time.

On one point there is considerable unanimity, however. WPB can't afford another major shakeup, a drastic reorganization, or even an extensive "realignment," as Donald M. Nelson, WPB chairman, dubbed the last reorganization.

Those who felt secure that production was good, despite materials shortages, were shocked by the President's statement in mid-September that production would have to be doubled. That shock alone may get WPB solidly behind those who think in terms of production engineering.

Unless WPB does engineer this production job, there is still an excellent chance that the Army and Navy will "move in."

Westward, March!

Most of the engineers in Army Ordnance Department are on the move to Detroit. Policies on engineering, production, procurement, etc., will stem from the Pentagon Building in Washington, but much of the actual engineering and contact work will be done in the Fisher Building at Detroit.

A. R. Glancy, former General Motors executive who has been commissioned a brigadier general, is counted on to steer the course of the automotive industry's armament production. An indication of the size of his job is that the Packard and General Motors proving grounds have been "drafted" by the Army.

Betting odds in Washington press rooms say that he's going to prove that the Army knows how to use engineering abilities. If he can engineer the Army Ordnance production program, he might be in line to engineer the nation's whole program.

Substitutions

A peacetime skeleton army has a lot of

growing pains to suffer in burgeoning into a 13,000,000-man organization, and one of the serious ones has been getting into the mental groove of substitutions and redesigning armament to permit more rapid production.

Good news: The Army is going to town on this problem. (See "Substitutions" p. 25.)

Rationing Miles

Although WPB, OPA, ODT and other war agencies are convinced that automotive miles will have to be rationed, only a few have been seriously contemplating a scheme that may work. Here's how it looks:

Personnel directors in all war plants would be deputized as rationeers, obtaining certificates from local rationing boards for only those workers who are sharing rides. Thus only workers who are known to be conserving gasoline and tires will be allowed recaps and gasoline.

Obviously, rationing is becoming a personnel problem of the first dimension. Absentees from war work plants don't help production.

On the other hand, there are several schemes in the "works" that sound more like the U. S. war agency philosophy: Questionnaire the hell out of one and all, analyze the answers, and scramble up a formula.

One of the OPA rationeers suggests that all "A" cards be taken back, and that the other cards, including the "S," be given a fine combing.

Army's Huge Truck Order

The Army's \$1½ billion truck order, involving 880,000 vehicles, will strain the automotive industry to its utmost to complete deliveries within a year. Average price, about \$2000.

A number of the vehicles will be new types, such as the amphibian truck with floating trailers hooked on behind.

Most will have wood bodies, all have had a careful working-over to save as much critical material as possible. Glider and training plane programs may cause a shortage of wood fabricators—which will be a World War II paradox.

Forty-one manufacturers have taken the 64 contracts.

The industry's previous all-time high was in 1941, with 1,094,261 trucks at a total wholesale value of \$1,086,925,650. This averages a little less than \$1000 each.

Hutchins Heads WPB in Detroit

Daniel Joseph Hutchins, Detroit, Mich., is regional director of WPB with headquarters in Detroit.

He joined the Automotive Branch, WPB, in February, and in May he became chief assistant to Ernest Kanzler, then Detroit regional director. He now replaces Mr. Kanzler, who has been made Deputy Chairman of WPB Program Progress. Mr. Hutchins was Detroit district manager for the Firestone Tire & Rubber Co.

Priorities:

Showdown Looms As WPB And A&NMB Seek Power

NOW something of a classic, the fight over the priorities rating power between the War Production Board and the Army & Navy Munitions Board may develop into a Pyrrhic victory for WPB—if it wins.

The Army and Navy have had the authority to issue priorities since the last war, were given another charter in the National Defense Act of 1920, and were given the right under the Office of Production Management set-up which preceded WPB.

Several weeks ago WPB Chairman Donald M. Nelson took back the authority from the Army and Navy procurement agencies, turning this function to WPB field offices.

But, the SAE Journal discovered, the Army and Navy are still assigning priorities. Reasons:

- Some of the service field organizations had not been notified, and
- Local WPB offices failed to act quickly enough on several occasions when asked to set priorities.

It took several weeks for WPB to get enough men into the field to check individual ratings. More than 300 priority specialists will be needed for this gigantic task, the lowest estimate says. Others feel that it will require 1000 specialists to do the job quickly enough.

A number of informed observers agree that if WPB wins it loses anyway, because of the "priorities inflation." Even WPB's top New York boss, Paul R. Smith says publicly that the "priorities system is about to fall apart," because there are about three times as many priorities issued as there is material, anyway.

Other allocation enthusiasts agree that, like in England, the priorities system has proved valueless in an armament program of this size.

WPB Ups Kanzler

When Ernest Kanzler was appointed Director General of Industry Operations of WPB on Sept. 2, following the resignation of Amory Houghton, he had been serving in Washington as deputy chairman of WPB in charge of Program Progress.

Joining the war effort early this year as chief of WPB's Automotive Branch, Mr. Kanzler undertook the job of Regional Director at Detroit several months later.

Mg. Production Soars

The world's largest magnesium plant is in operation at Las Vegas, Nev., with a rated capacity of about 3½ times the 1941 U. S. output.

Other new magnesium plants in operation:

- Dow Chemical Co., Texas,
- Ford Motor Co., Mich.,
- Permanente Metals Corp., Manteca, Calif., and

• New England Lime Co., Conn.

The big Las Vegas plant is operated by Basic Magnesium, Inc., and with the Dow plant uses standard electrolytic process. The others use the new ferro-silicon process developed within recent months.

The U. S. outlay for these and other plants nearing completion runs well beyond \$200 million, with the five new ones totaling \$175 million. Four more new electrolytic plants will be in operation by year's end.

Metal of Mars Shows Big Gains

THREE-quarters of the nation's steel output of 5,300,000 tons a month is now going into direct war production, and the rest to railroads, machinery manufacture, and new plants and equipment. About 80% is being delivered on ratings of A-1-a or higher.

The steel output picture:

Year	Ingot Production (in net tons)	Steel Making Capacity (in net tons at year end)
1939	52,798,714	81,000,000
1940	66,982,686	84,000,000
1941	82,927,557	88,000,000
1942	86,000,000	93,000,000
1943 (mid year)		98,000,000

Steel mills and rolling mills will produce about 62,000,000 tons of plates, shapes, sheets, bars, pipe, wire, rails, etc., from the 86,000,000 tons of ingot. The remaining 30% goes back to furnaces as scrap.

Prospectors, Ho! New Deposits of Critical Materials Being Sought

BLACK sands along the beaches of Oregon, long known to have deposits of chromium ores, are being studied with the aid of the magnetometer by the Krome Corp. and the U. S. Geological survey.

This device is sensitive to magnetite, which occurs in these black sand areas.

Some of the deposits, proved by drilling, are 70 ft deep, and run from 5 to 9% of chromic oxide.

Other materials present:

- Ilmenite, a base for paint,
- Zircon, used for fire brick and baking enamels, and
- Manganese oxides.

Success of these modern explorations, which have checked some of the reports of prospectors in those areas 75 years ago, indicate that large-scale mining and refining operations might be supported.

Silica Gel Allocated

Integrated closely with the war production program, largely through the standardization work by an SAE committee on the Preservation of Aircraft Engines, silica gel is now controlled by a conservation order (M-219, Sept. 3).

The Thousand Million

UNITED NATIONS

where live, work, and fight
One Thousand Million Friends of
THE UNITED STATES

New OWI pamphlet issued by the government on the eve of the third anniversary of Germany's invasion of Poland. It outlines the military strength and backgrounds of the peoples of the United Nations. Available free from the Office of War Information, Washington, D. C.

'Standisit' Bows In Washington

AMONG the startling innovations introduced by war, is a new method to crowd more men and women into buses. Sponsored by the Office of Defense Transportation and developed by Penyan Coaches, Inc., this straphangers' delight is a tilting shelf against which the passenger leans in a half-standing, half-seated position.

Centers of the seats are about 18 in., whereas bus seats normally are from 28 to 34 in. apart. Thus in a normal-sized metropolitan bus or street car, equipped with "standisit" seats, capacity will be increased by about 40%.

ODT's hope:

- That passengers will prefer these seats to standing, in order to:
- Increase passenger capacity on buses and street cars, and to
- Save critical materials. "Standisit" seats are made almost entirely of wood.

Public demonstrations have been arranged by ODT with the Capitol Transit Co., Washington.

Photos of Washington girls trying to appear comfortable in this trick posture have been released.

Ends Metal Oil Cans

Only government procurement agencies may buy lubricating oil in metal cans, in a drastic effort to conserve more steel. Steps:

- M-81 (June 27) barred tin and terneplate for civilian use of oil cans.
- M-136 (July 22) prohibited the civilian use of black plate for this purpose.
- M-81-b (July 23) permitting use of terneplate for oil cans was revoked Sept. 2.

Victory-Grams



MAJOR-GEN. CHARLES M. WESSON, FORMERLY CHIEF OF ARMY ORDNANCE, HAS BEEN APPOINTED AN ASSISTANT TO EDWARD R. STETTINIUS, JR., LEND-LEASE ADMINISTRATOR.

CURB ON FLUORESCENT LIGHTING, WHICH HAD BEEN INTRODUCED TO FACTORIES SHORTLY BEFORE THE WAR EMERGENCY, HAS BEEN SET FOR OCT. 1. ONLY THE GOVERNMENT AND HIGH-RATED PLANTS MAY INSTALL THIS EQUIPMENT.

ADDITIONAL HOUSING FOR 15,000 WAR WORKERS AT WILLOW RUN APPROVED BY WPB TO AUGMENT 4500 PRIVATELY-FINANCED HOMES FOR THE HUGE FORD MOTOR CO. BOMBER FACTORY.

PATTERN OF RENTAL PRICES FOR ROAD-BUILDING MACHINERY WAS SET BY OPA IN SCHEDULE ESTABLISHED IN MICHIGAN. RATES ARE LIBERAL, WITH OPENINGS FOR SPECIAL INCREASES TO BE "ARBITRATED."

RAPID RATE OF INCREASE IN NUMBER OF LABOR-MANAGEMENT COMMITTEES OF WAR PRODUCTION DRIVE EFFORT IN RECENT MONTHS HAS BROUGHT TOTAL TO MORE THAN 1500. PERCENTAGE INCREASES HIT 73 IN MACHINE-TOOL INDUSTRY LAST MONTH.

TIN-CAN DETINNING CAPACITY WILL PRODUCE 3000 TONS OF TIN AND NEARLY 300,000 TONS OF SCRAP STEEL WHEN FLOW REACHES MAXIMUM, WPB SAYS.

TIGHTNESS OF COPPER SITUATION IS SO SEVERE THAT EVEN COPPER CHEMICALS HAVE BEEN PUT UNDER COMPLETE ALLOCATIONS BY WPB (M-227, SEPT. 9).

DICHLORETHYL, SELECTIVE SOLVENT USED IN LUBRICATING OILS AND BUTADIENE, HAS BEEN ALLOCATED FOR MILITARY AND HIGH PRIORITY USES BY WPB (M-226, SEPT. 5).

Heads Steel Branch

David F. Austin, vice president of Carnegie-Illinois Steel Corp., and who has been with WPB's steel branch since last February, has been named deputy chief of the Iron & Steel Branch.

He succeeds Reese H. Taylor, who returns to the presidency of the Union Oil Co., following his recent resignation.

Thus, the branch has had four heads and four titular or acting heads, since the days of the National Defense Advisory Commission under E. R. Stettinius, Jr.

About SAE Members

GEORGE SPATTA has been elected executive vice president of the Clark Equipment Co., succeeding A. S. Bonner, who



George Spatta

was elevated to president following the death of E. B. Clark. Mr. Spatta joined the Clark Equipment Co. in 1927 as a development engineer, and became vice president and general manager in 1935.

CHARLES O. BALL, who had been chief engineer of GM's Truck & Coach Division, Pontiac, Mich., has become vice president of engineering of the Yellow Truck & Coach Mfg. Co.

RICHARD L. SMIRL, who had been engineer in the Borg & Beck Division, Borg-Warner Corp., Chicago, has become associated with General Motors as engineer in design and development in the Product Study Group, Detroit.

Formerly assistant manager and buyer for Mackenzie Auto Equipment, Pocatello, Idaho, **C. B. HOLST** recently became connected with the War Department Requirements Division, U. S. Army Ordnance Department, Washington, as technical adviser.

ROBERT E. KERR is a layout engineer in the Central Office of Engineering of the Chevrolet Motor Co., Detroit. Before joining Chevrolet, Mr. Kerr was development engineer for Aviation Spark Plugs, Defiance Spark Plug Corp., Toledo, Ohio.

CHRISTOPHER BOCKIUS recently joined the American Machine & Foundry Co., Brooklyn, N. Y., as director of engineering.

BRUNO LOEFFLER has left his position of engineer at the International Plainfield



Bruno Loeffler

Motor Co., Plainfield, N. J., and has become chief engineer of the American Bosch Corp., Springfield, Mass.

H. W. CRAM is now vice president in charge of sales, the Aircraft Screw Products Co., Inc., Long Island City, N. Y. He was promoted from the position of sales manager with the same company.

PHILIP S. PARKER has resigned from his position as general manager of Frank G. Spurway Pty., Ltd., Sydney, Australia, and is now associated with the International Radio Co. Pty., Ltd., as director and general manager of their subsidiary company, Jensen Pty., Ltd., Australia.

F. C. KRUMMEL has become associated with the Thomas A. Edison Co., N. J., as assistant tool engineer in the Special Products Division. Prior to this he was designer and draftsman at the Lamson Corp., Syracuse, N. Y.

ELEANOR ALLEN has joined the patent research department of Manufacturers Aircraft Association, N. Y. C., as an engineer-



Eleanor Allen

ing assistant. Miss Allen was formerly detailer at the Pioneer Instrument Division of Bendix Aviation Corp., Bendix, N. J.

G. HERBERT MILLER, who had been general manager of N. R. Miller & Co., Toronto, Ont., Canada, now is associated with the Trade Administration of the War-time Prices and Trade Board, Toronto.

RAYMOND E. DUNN is resident Chevrolet engineer at Pratt & Whitney Aircraft, East Hartford, Conn. We stated in error last month that Mr. Dunn was with Chevrolet-Motor & Axle, Division of General Motors Corp., Buffalo.

GEORGE WILLIAM LEWIS became a senior engineer with the Electric Auto-Lite Co. of Toledo. Mr. Lewis had been assistant chief engineer at the La Plant Choate Mfg. Co., Cedar Rapids, Iowa.

JOHN E. POWK, formerly airplane and engine mechanic, Eastern Air Lines, Inc., Washington National Airport, Washington, has become a flight instructor at the Richmond Air Transport & Sales Service, Byrd Field, Richmond, Va.

F. W. VON MEISTER has become general manager of the Specialties Co., Locust Valley, L. I., N. Y., where restricted ordnance instruments are being manufactured.

IVER T. ROSENLUND is a fuel and lubrication engineer for the Allison Division of General Motors, Indianapolis, Ind.

CLARENCE E. MOORE, formerly president of Moore Products, Inc., Cleveland, is



Clarence E. Moore

now in the Office of the Chief of Ordnance, War Department, Washington, as tank maintenance engineer.

HARRY R. DeSILVA, research associate, Institute of Human Relations, Yale University, New Haven, Conn., and more recently with the Office of Price Administration, Washington, is author of a new book titled *Why We Have Automobile Accidents*, published by John Wiley & Sons, Inc., N. Y. Mr. DeSilva outlines the various phases of the highway safety problem, and throughout the book he emphasizes the paramount importance of the driver.

S. H. LOXTON is chief engineer of the East Kent Road Car Co., Ltd., Canterbury, Kent, England. Mr. Loxton was formerly engineer and assistant to the general manager of this company.

HARRY O. HILL has joined the American Bosch Corp., Springfield, Mass., as engineer of the Gasoline Injection Division. Mr. Hill was formerly assistant manager of the Western Division of the same company, located in Chicago.

C. LYLE DAVIS is manager of the Minneapolis-St. Paul operations of the Macmillan Petroleum Corp., St. Paul. Formerly Mr. Davis had been manager of the Cleveland Branch office, Diesel Engine Works, of the same company.

Formerly director of the Division of Air Transportation, Matson Navigation Co., San Francisco, **CLARENCE M. BELINN** is now with Hawaiian Airlines, Ltd., Los Angeles.

JOHN S. HARPER, formerly connected with the Pittsburgh Division of the Gulf Oil Corp., was promoted to the general office of the Gulf Oil Corp., where he is assistant to the manager of the Contractors Sales Department.

DONALD B. FERGUSON has been transferred to the Cleveland and Pittsburgh territory of the Studebaker Sales Corp. of America, and can be reached through the Cleveland office of the company. He was formerly special representative of the same company at Chicago.

ALBERT A. ARNHYM is chief engineer of the Pacific-Airmax Corp., Huntington Park, Calif., manufacturers of aircraft heating and ventilating equipment and other

airplane accessories. He was formerly vice president and chief engineer of the Airmax Corp., San Diego, Calif.

FRANK A. SHARPE, veteran automotive sales and engineering executive, now with the Mid-West Abrasive Co., Detroit, has been promoted to sales manager. Mr. Sharpe's experience in the automotive field dates back to the turn of the century when



Frank A. Sharpe

he went to work for the Packard Motor Car Co. Subsequently he was with the Winton Co., White Motor Co., Cole and Woop, Pierce Arrow, Russell Motor Car Co., Willys Overland, Hupp, Mitchell, Thermoid Rubber, Bondall Co., and the Inland Mfg. Division of General Motors. He joined the Mid-West Abrasive Co. staff about a year ago. Mr. Sharpe has been a member of the SAE for 17 years.

MYRON W. TURNER was recently transferred from the Detroit office to the Washington office of the Electric Storage Battery Co. He is in the sales engineering department, as he was when in Detroit.

Formerly a development engineer, Douglas Aircraft Co., Inc., Santa Monica, Calif., **JOSEPH N. STANFORD** was recently promoted to chief of design and drafting, Project 19, and is located in the New York office of Douglas Aircraft.

New P. M. Heldt Book

The only "volume in the English language devoted solely to the subject of transmissions or torque converters," has just been announced by Author-Publisher, **P. M. HELDT**, engineering editor, *Automotive Industries*. Titled "Torque Converters or Transmissions," Mr. Heldt's latest automotive text is designed to synthesize and correlate the many and diverse types of automotive transmissions now extant, from the conventional types in use by the million to those still in the experimental stage. Including full treatment of mechanical, hydraulic, electric, pneumatic, and differential transmissions—stepped and continuously variable; manual, semi-automatic and automatic—in its 406 pages, the new book blankets the field completely. Publisher is P. M. Heldt, Nyack, N. Y.

In Military Services

A. J. SCHAMEHORN has been commissioned colonel in the Ordnance Department, and has been made deputy chief of the Rochester Ordnance District. Col. Schamehorn was for many years general manager of the General Motors Proving Ground, and more recently assistant general manager of the Linden Division of General Motors.

COL. M. V. BRUNSON has been transferred from Headquarters I Army Corps, Columbia, S. C., to Headquarters Quartermaster Replacement Training Center, Camp Lee, Va.

LT.-COL. HENRY F. HAYWARD, assistant director of ordnance, is now stationed in the Central Provision Office, Simla, India, on military duty dealing with the provisioning of military technical equipment. He was formerly a major in the Australian Army, Headquarters Melbourne, Vict., Australia.

C. L. FIKE has been promoted from major to lieutenant colonel, U. S. Marine Corps, and was transferred from Pearl Harbor, T. H., to San Francisco.



Joseph A. Moller

Formerly chief products engineer, Pure Oil Co., Chicago, **JOSEPH A. MOLLER** is now a lieutenant colonel in the Army Air Forces.

LT.-COL. C. G. KUSTNER, on leave of absence from the Standard Oil Co. of Indiana, was recently promoted from major. He is stationed at Fort Leonard Wood, Mo.

MAJOR LLOYD E. ARNOLD, manager of the Government and Aircraft Products Division of P. R. Mallory & Co., Inc., Indianapolis, is now on duty with Headquarters Army Air Forces, Washington.

MAJOR CARL E. CUMMINGS is now with the Tank and Motor Transport Branch, Office of Chief of Ordnance, Arlington, Va. Previously Major Cummings had been in the Tank and Combat Vehicle Division, Ordnance Department, Washington.

G. B. HARRIS, formerly automotive engineer in the U. S. Civilian Conservation Corps, Office of Director, CCC Motor Repair Division No. 1, Fort McHenry, Baltimore, is now a major in the U. S. Army, Maintenance Division, Motor Transport Service, Washington.

M. F. WEILL, formerly a captain, in the U. S. Army, Quartermaster Corps, Regional QM Motor Transport School, Stockton QM Motor Base, Stockton, Calif., is now a major, Headquarters Western Defense Command and Fourth Army, Office of the Assistant Chief of Staff G-4, Presidio of San Francisco, Calif.

MURTEN G. HIETT is a captain in the War Department, Corps of Engineers. He is chief of the spare parts Technical Section, and is headquartered in Columbus, Ohio. This section is responsible for the preparation of the Table of Basic Allowances of Spare Parts for all Corps of Engineers' equipment broken down in 1st, 2nd, 3rd and 4th Echelon maintenance and repair.

R. O. SLATTERY was recently ordered to report for active duty in the U. S. Army at the Aberdeen Proving Grounds, Md., as a captain in the Ordnance Department. He is on leave of absence from his position of sales engineer at the Shell Oil Co., Inc., St. Louis, Mo.

CAPT. RAY H. BRUNDIGE, reserve officer, has been on active duty in the U. S. Army for several months. In civilian life he was transportation engineer, Columbia Terminals Co., St. Louis, Mo.

CAPT. LEA R. STAIGER, Headquarters, 1st QM Motor Base, A.P.O. 1230, N.Y.C., has been promoted. He had been a lieutenant in the U. S. Army, Holabird QM Depot, Baltimore.

MAJOR AL BODIE, formerly production consultant with the Aircraft Section, War Production Board, is now production expeditor of the Army Air Forces, Wright Field, Dayton, Ohio. Enlisting in World



Al Bodie

War I, he was in charge of the airplane engine reconditioning shops at Tours, France, and had supervision of LeRhone, Clerget, Hispano-Suiza, Liberty and Fiat engines. He was instrumental in converting standards from metric to feet in this work. Before entering government work more than a year ago, he was service manager for General Motors Corp. in the southern states, and has worked for Chrysler Corp. and other automotive companies during the peace interim.

ROBERT J. GROW was recently appointed a lieutenant in the U. S. Army. Lt. Grow has just completed training at the Holabird Motor Base, Baltimore, and expects to be leaving there shortly.

SAMUEL KALMIN is a lieutenant in the U. S. Army, QM Corps, Holabird Motor Base, Baltimore. In civilian life Lt. Kalmin was fleet maintenance superintendent, Hygrade Food Products Corp., Newark, N. J.

LT. JACK M. RADKEY is in the Engineer Amphibian Command, U. S. Army, Camp Edwards, Mass., and is in charge of engine repairing and all boat maintenance which can be accomplished afloat. Formerly he was chief instructor, Guiberson Diesel Engine Co., Dallas, Tex.

VYRON E. ANDERSON, a former Iowa State College student, was called into active duty. He is a lieutenant in the U. S. Army, and is stationed at Fort Dodge, Iowa.



D. G. Samaras

Formerly an RCAF flying officer, with headquarters in Ottawa, Ont., Canada, **D. G. SAMARAS** is now a flight lieutenant and is posted overseas.

LT. LEONARD G. SCHNEIDER is no longer instructor in thermodynamics and internal combustion engines at the University of Wisconsin, having gone on active duty as a first lieutenant in the Ordnance Department, assigned to the Automotive Section, Staff and Faculty of the Ordnance School, Aberdeen Proving Ground, Md.

JOSEPH C. ANDERSON, who had been sales engineer at Wright Aero, Ltd., Los Angeles, is a lieutenant, U. S. Naval Reserves, U. S. Navy Bureau of Aeronautics, Washington.

WILLIAM K. BENNETT has accepted a commission as first lieutenant in the QM Motor Transport Corps. He was formerly service manager of the Brooklyn branch of the White Motor Co., Brooklyn, N. Y.

THOMAS J. HART is a lieutenant in the U. S. Army Air Forces, and is stationed at Wright Field, Dayton, Ohio. Before going on active duty, Lt. Hart was an engineer at the Aeroplane Division of the Curtiss-Wright Corp., Buffalo, N. Y.

MILTON K. McLEOD is a first lieutenant in the U. S. Army Air Forces, and is stationed at the Materiel Center, Wright Field, Dayton, Ohio. Before entering service Lt. McLeod was a research engineer at the Waukesha Motor Co., Waukesha, Wis.

LEE G. SNYDER, who had been staff electrical design engineer for the Vega Aircraft Corp., Lockheed Air Terminal, Bur-



Lee G. Snyder

bank, Calif., has been called to active duty as a lieutenant, U. S. Naval Reserves. He has been assigned to the Radio and Electrical Section of the Bureau of Aeronautics, Navy Department, Washington.

WILLIAM B. BASSETT is on leave of absence from the Sinclair Refining Co., Kansas City, Mo., and is at present stationed at the U. S. Army Ordnance School, Aberdeen Proving Ground, Md. He is a second lieutenant.

GERALD J. McCAUL, who had formerly been a test engineer at the Allison Division of the General Motors Corp., Indianapolis, is a second lieutenant, in the U. S. Army Air Forces, Power Plant Laboratory, Experimental Engineering Section, Materiel Center, Wright Field, Dayton, Ohio.

FRED J. BUJAK, formerly a private in the U. S. Army, Cavalry School, Fort Riley, Kans., has been transferred, and he is now an engineering aviation cadet in the U. S. Army Air Forces, Chanute Field, Ill.

JAMES E. WASEM, JR., who had been a junior engineer in the Ordnance Department, Automotive Research and Design Department, Aberdeen Proving Ground, Md., is now an aviation cadet in the Engineering Division of the U. S. Army Air Forces, remaining at Aberdeen.

ALAN H. WOODWARD, who had been engineer at Mullins Fishing Gear, Inc., Pier 4, New Bedford, Mass., is now outside machinist at the Fore River Shipyard of the Bethlehem Steel Co., Quincy, Mass.

ROBERT G. MORGAN has been made manager of the Industrial Division of the Timken Roller Bearing Co., Ltd., Toronto, Ont., Canada. He was formerly sales engineer of the Canton, Ohio, office of Timken.

H. W. SULLIVAN has been promoted from chief engineer of Briggs Clarifier Co., Washington, to zone manager at Dallas.

Formerly superintendent of operations, Seaboard Transportation Co., Stockton, Calif., **ROBERT J. HUTCHINSON** has joined the engineering department of the Kenworth Motor Truck Corp., Seattle, Wash.

M. MERWIN EELLS has joined the staff of the Aircraft Radio Corp., Boonton, N. J.

A. W. HERRINGTON, SAE president, and president of the Marmon-Herrington Co., Inc., Indianapolis, was recently elected a director of The Aviation Corp.

LEROY P. STERLING recently joined the faculty of the University of Alabama as assistant professor of mechanical engineering. He was previously employed as ground instructor of aviation engines, at the Riddle Institute of Aeronautics, Carlstrom Field, Arcadia, Fla.

Recent graduates from the Massachusetts Institute of Technology include **DONALD P. GREATOREX**, now a trainee in graduate engineers course, Pratt & Whitney Aircraft, East Hartford, Conn.; **WILLIAM L. STEINWACHS**, performance analyst, Wright Aeronautical Corp., Cincinnati; **JOHN DRAKE ROGERS**, engineering training program, Wright Aeronautical Corp., Cincinnati; **RUSSELL J. ESTELLE, JR.**, experimental test engineering trainee, Wright Aeronautical Corp., Paterson, N. J.; **HERBERT H. HOWELL**, junior engineer, Plant No. 1, Wright Aeronautical Corp., Paterson; **LT. JOHN M. DEBEVOISE**, experimental Engineering Section, Army Air Forces Materiel Center, Wright Field, Dayton; **ENSIGN CUTLER JONES**, USNR, U. S. Naval Training Station, University of Notre Dame, Ind.

Entertains Hero

STANLEY WHITWORTH, vice president in charge of production of the Studebaker Pacific Corp., Los Angeles, showing the plant which is helping to build aircraft engines to Lt. Griffith Williams, one of the heroic flyers who helped to bomb Japan under the command of **BRIG.-GEN. J. H. DOOLITTLE**. Lt. Williams, who has been decorated with the Distinguished Flying Cross and the Military Order of China for his part in the bombing mission, is 22. He was accompanied by a group of Army officers on his inspection trip.



Stanley Whitworth and Lt. Griffith Williams

JARVIS C. BUXTON has been advanced from tool designer to chairman of the customer modification committee and group planner in charge of changes, Vega Aircraft Corp., Burbank, Calif.

ALBERT C. SANFORD has left the Sun Mfg. Co., Chicago, where he was successively sales engineer and New York manager, and is now final inspector for the Federal Products Corp., Providence, R. I.

F. SERGARDI is head standard consultant in the Army Signal Corps Development Laboratory, Fort Monmouth, N. J.

Formerly senior examiner with the British Air Commission in Detroit, **ERNEST A. BROOKBANKS** is now with the technical branch of the Royal Canadian Air Force, Toronto, Ont., Canada.

KENNETH I. ROBINSON recently accepted a position as laboratory engineer in the Spark Plug Laboratory of the Electric Auto-Lite Co., Toledo. Previously he was with the International Harvester Co., Fort Wayne, Ind., in the same capacity.

Formerly an engineer at the Wroble Engineering Co., Schenectady, N. Y., **WOODROW L. WROBLEWSKI** is now stress engineer at the Eastern Aircraft Division, General Motors Corp., Trenton, N. J.

PAUL E. TOBIN has been advanced from sales engineer in the Cleveland office of the White Motor Co., to regional manager of the metropolitan area, and is headquartered in New York City.

SAMUEL R. WATSON has joined the staff of Tool Design & Engineering Service, Detroit, as process engineer. Mr. Watson had been engaged in tool layout and design for the Acme Pattern & Tool Co., Dayton, and the Emerson Electric Mfg. Co., St. Louis.

CONRAD A. TEICHERT is now associated with the Irving Pedersen Arms Co., Grand Rapids, Mich., as process engineer. Prior to joining this company he was employed for several months as tool designer, Allied Process Engineers, Newark, N. J., and was previously with the American Bosch Corp., Springfield, Mass., as project engineer.

JOHN F. MAXWELL is in the Service Division of the Cleveland Tractor Co., Cleveland, having left his position as Eastern District representative of the Roadmaster Products Co., Los Angeles.

The Sealed Power Corp. of Canada, Ltd., Windsor, Ont., has announced the appointment of **ROY TOMPKINS** as manager of the Replacement Division. Mr. Tompkins has been Western District manager for Sealed Power for the past six years, and prior to his connection with this company he was manager of one of the largest garages in Winnipeg.

P. E. BARDSLEY has been transferred from manager of the Detroit operations to the position of assistant chief inspector, Delco-Remy Division, General Motors Corp., Anderson, Ind.

DONALD FAIRBAIRN, formerly salesman for the B. F. Goodrich Co., Detroit, has been made sales engineer of the War Products Division of the company, and is located at Akron.

ROBERT F. BUKOFER is no longer with A. E. Friedgen, Inc., New York City,

where he was transportation consulting engineer. He recently joined the Propeller Division of the Curtiss-Wright Corp., Caldwell, N. J., as field service representative.

Formerly assistant chief inspector of the Ryan Aeronautical Corp., San Diego, Calif., **FRANCIS E. O'CONNOR** is now senior instructor (customer training), at the Northrop Aircraft, Inc., Hawthorne, Calif.

ALBERT P. SCHWARZ is a statistical clerk in the Ordnance Department, Ammunition Division of the U. S. Army, War Department, Arlington, Va.

C. H. SPECK recently accepted a position as superintendent of processes for the Wichita Division of the Boeing Airplane Co. Mr. Speck had been methods engineer at Cessna Aircraft Co., the same city.

H. V. THADEN has left his position as vice president of manufacturing, Duramold Aircraft Corp., New York City, and is at present connected with the Thaden Engineering Corp., Roanoke, Va.

Promotion of **W. E. HALL** from sales engineer, Detroit, to sales manager, Harris Products Co., Cleveland, recently took place.

G. C. RICHARDSON has been called to Washington in the capacity of chief of the Production Planning Unit, War Agencies Section, Automotive Branch, WPB. In civilian life Mr. Richardson is assistant transportation superintendent of Cities Service Oil Co., Bartlesville, Okla.

V. L. MALEEV, professor of mechanical engineering of Oklahoma A. & M. College, Stillwater, has left this position and is now senior diesel mechanical engineer, U. S. Naval Engineering Experiment Station, Annapolis, Md.

Ernest F. Davis

Ernest F. Davis, chief metallurgist of the Warner Gear Division of the Borg-Warner Corp., Muncie, Ind., died Aug. 25, in Chicago. Mr. Davis was known throughout the country as an authority on metallurgy in



Ernest F. Davis

the automotive industry. He was associated with Borg-Warner for many years, with the exception of a few years spent in Elmira, N. Y., at about the time of the first World War as chief metallurgist for the Willys-Morrow Co. Mr. Davis joined the Society

Formerly vice president and sales manager of the Tuckett Printing & Lithography Co., Seattle, Wash., **MERRILL T. CLARK**'s business connection is now the Boeing Aircraft Co., Seattle. Mr. Clark is in the inspection department.

Promotion of **LEROY W. GRIFFITH**, Shell Oil Co., Inc., Wood River, Ill., recently took place. He went from junior mechanical engineer in the research department to senior research engineer.

E. L. MENCH, JR., has been transferred from the Holabird Quartermaster Motor Base, Engineering Division, Baltimore, to the Ordnance Department, Motor Transport Service, Procurement Division, Detroit.

Formerly associate industrial specialist, WPB, **KENNETH L. CHILDS** is now a WPB Navy Section Engineer, and is headquartered at New Haven, Conn.

An indefinite leave of absence from the Shell Development Co., Emeryville, Calif., has been granted to **LLOYD A. BROCKWELL**. He is at present with the Columbia University, Division of National Defense Research, located at the U. S. Navy Underwater Sound Laboratory, Fort Trumbull, New London, Conn.

PHILIP RUSKIN, formerly manager of the automotive department, the Commercial Filters Corp., Boston, has joined the U. S. Army Signal Corps, Radar Laboratory, Automotive and Power Section, Camp Evans, Belmar, N. J., as an engineer.

JACK P. HORNING has become affiliated with the engineering service staff of Adel Precision Products Corp., Burbank, Calif. Mr. Horning leaves the Firestone Tire & Rubber Co., Los Angeles, where he was sales engineer of Firestone Aviation Products Co.

in 1911, has been a very active and valuable member of the Iron and Steel Division of the Standards Committee since 1934, and vice chairman of the Division since 1935. He has been a member of the Lubricants Division since 1936 and chairman of a special subdivision of the Iron and Steel Division that developed the new method of determining hardenability that was incorporated in the SAE Standard for steels.

William F. Carper

William F. Carper, Walla Walla district sales manager of the General Petroleum Corp. of Calif., died Aug. 13. Mr. Carper was educated at Washington State College. He joined General Petroleum in 1925 as district lubrication engineer.

Kenneth W. Bair

Kenneth W. Bair died Aug. 19, at the age of 46. At the time of his death, Mr. Bair was chief inspector of the Briggs & Stratton Corp., Milwaukee.

William Samuels

William Samuels, project engineer at the Chevrolet Central Office, Division of General Motors, Detroit, died on Aug. 28, at the age of 56. He was educated in Berlin, where he received his degree of mechanical engineer in 1907.



SAE Grants Section Status to Texas Group

At the SAE Council Meeting of Sept. 18, approval was given to the petition of the SAE Texas Group to become a Section. The members of this Section are very enthusiastic and well organized.

Initial steps in the organization of the Texas Group were taken June 27, when SAE members and others interested in a Group in Texas met at the Texas Agricultural and Mechanical College.

Colwell Speaks

SAE Past President Arch T. Colwell was the speaker at the Texas Section's Aug. 26 meeting in Dallas. His subject, "Behind the Scenes in War Engineering," was illustrated with slides of German and Japanese airplanes and engines.

Seven members of the new Texas A & M Student Branch attended, and a get-together was held after the meeting for the members and guests.

Air Raid Alert Rules Out Inspection Plans

■ Oregon

THE U. S. Army Air Base in Portland was the locale of the Aug. 14 meeting, but air raid alert activities made it impossible to inspect the base, as originally planned.

Lt. James K. Flack welcomed the SAE members and their guests, and Lt.-Col. Alfred P. Kelly discussed the military and civilian responsibilities in this war, and the need for an all-out war effort on the part of every individual. He also gave an outline of what could happen here.

Texas A & M Student Club in Progress

An organization meeting of the SAE Student Club at Texas A & M College was held on Aug. 18. Charles R. Ursell was made chairman of the Student organization. Other officers elected were Frank R. Young, vice chairman; David Scott Kauffman, ordinance secretary; and J. J. Hoss, treasurer. W. I. Truettner, professor of mechanical engineering, is sponsoring the group.

Membership is open to any student taking engineering who is interested in aircraft, diesel, tank, tractor, or any type of internal combustion engines.

The Council of the Society granted an SAE Student Branch Charter to the organizing group at the Council's Sept. 18 meeting.

Bearing Metals and Some Substitutions Discussed

■ Northern California

No physical property of a bearing metal offers a reliable and easy guide for predicting the performance of dissimilar bearing metals, Albert B. Willi, chief engineer, Federal-Mogul Corp., stated in a paper read in his absence by R. A. Watson, factory manager of Federal-Mogul's Pacific Division at the Sept. 8 meeting of the Northern California Section. Nearly 100 attended the session which was held at the Leamington

SAE JOURNAL FIELD EDITORS

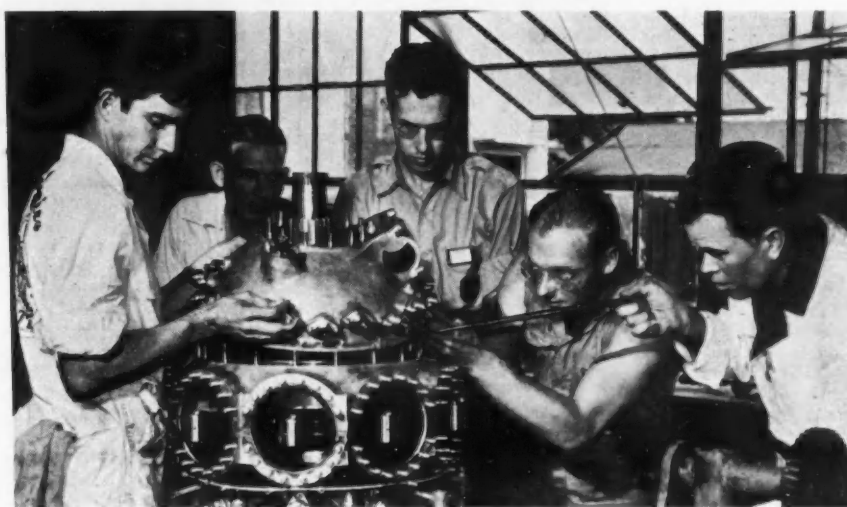
Baltimore - J. F. Rowley
Buffalo - George W. Miller
Canadian - Warren B. Hastings
Chicago - Austin W. Stromberg
Cleveland - Robert F. Steeneck
Dayton - L. Parmakian
Detroit - W. F. Sherman
Indiana - Harlow Hyde
Kansas City - Howard F. Dougherty
Metropolitan - Charles F. Foell
Milwaukee - Gene D. Sickert
New England - James T. Sullivan
No. California - E. J. McLaughlin
Northwest - Lee Ketchum
Oregon - Dick F. Wagner
Philadelphia - T. B. Hetzel
Pittsburgh - Murray Fahnestock
St. Louis - Roy T. Adolphson
So. California - L. L. Benbow
So. New England - J. A. Clark
Syracuse - No Appointment
Southwest Group - W. F. Lowe
Washington - Paul B. Lum

Hotel, Oakland, Calif. "Bearings for Diesel Engines" was the title of his talk.

"This means," according to Mr. Willi, "that in selecting substitute materials experience and actual performance factors will be of major importance."

Discussing particularly the possibility of substituting lead-base babbitt for tin-base in diesel- or gasoline-engine bearings, Mr. Willi

Guiberson Presents Engine to Student Group



Allen W. Guiberson, president of the Guiberson Corp., Dallas, presented this 1400 series radial aircooled engine to the Texas A & M College. Levi Hays (right), chief mechanic of the Guiberson Diesel Engine Co., Garland, instructs a group of Texas A & M students in the assembly of the engine. Left to right are Steve Kaffer; W. I. Truettner, professor of mechanical engineering and sponsor of the Texas A & M Student Branch; Gene Clark; and E. C. Pauls.

said the situation is not at all gloomy, despite some opinions to the contrary. It can't be said that lead-base babbitt can replace tin-base babbitt under all conditions, Mr. Willi admitted, but stated definitely that "it is possible to specify certain lead-base babbitts, applied under definite conditions which will replace certain tin-base babbitts and obtain improved performance."

As an alternative for cadmium-silver copper or other cadmium-alloy bearings, Mr. Willi indicated, the selections lie between a lead-base babbitt and a copper-lead mixture.

Discussion

Responding to questions asked by Sidney B. Shaw, Pacific Gas & Electric Co., Mr. Watson agreed that many bearings had been replaced because of discoloration which was mistakenly assumed to be corrosion, when they could have been continued in use satisfactorily; said that it is impossible to distribute the wear on bearings by reversing them—particularly in heavy-duty engines; emphasized the importance of maintenance of reasonable oil temperatures as an important factor in bearing life; reported data which indicated that increase in oil pressure—particularly where low-speed lugging might be expected—is highly desirable; and finally defined the efficiency of a bearing "as ability to maintain an oil film and therefore its useful life."

Peter Glade, Purity Stores, Ltd., asked about the probable effect on bearing life of lower operating speeds and also what truck operators might expect in the line of future bearings as current metal shortages get more acute.

Bearing life will be shorter at lower speeds, Mr. Watson replied to the first query, envisioning this result because of the lower oil pressures and increased low-speed lugging which would result. As regards future availability of metals, Mr. Watson was necessarily indefinite, but ventured the opinion that no severe shortage of copper-lead bearings was likely because there appeared to be an adequate supply of these basic metals.

Answering T. S. White, Enterprise Engine Co., Mr. Walker said that bearing temperatures usually are 25 to 75 F higher than crankcase oil temperatures, although in some heavy duty slow-speed, stationary oil engines the bearing temperatures are more nearly equal to those in the crankcase.

A query by Mr. Glade about compounded and uncompounded lubricating oils, Mr. Watson turned over to Lt. Lloyd H. Mulit, USN, formerly of the Standard Oil Co. of Calif. Lt. Mulit expressed his belief that most compounded oils tend to be superior, but that the great variations in both types made specific answer to such a question impossible. C. F. Becker, Tide Water Associated Oil Co., emphasized that the discoloration of bearings, particularly with compound lubricants, should not be considered as detrimental, because, in some cases, the film actually improved bearing life.

Mr. Watson had no data of the possibility of gold as a bearing material.

SAE Peoria Club Is Born

An SAE Peoria Club has been formed, following several meetings of an organization committee and steady growth in SAE interest in this area during recent years. Already programs have been planned for each month through January, 1943.

The first meeting is scheduled for Oct. 26.

Condensed

International



AIR TRANSPORTATION

Caribbean, "Birthplace of Hurricanes," Was Laboratory for First Oceanic Flights

By H. W. Peterson*

■ Southern California

WE can look forward to magnificent advances in transoceanic airplanes soon because we will see:

Wing loadings of 80 lb per sq in.;
Aspect ratios (span to wing breadth) of 11;

Useful to gross weight ratios of 50%, and
Efficient 3000 hp engines.

All this is based upon intensive development during the past few years and research work now being carried on by airlines and military experts. These researches will bring about:

Frequent daily flights operating on a 12-hr schedule between America and Europe;

Daily flights from California to Hawaii on 8½-hr schedules, and daily flights from Buenos Aires to London and Paris;

Flights from Buenos Aires to New York with only one stop;

Radio and electrical devices to permit landing in zero visibility.

Pan American Airways inaugurated the first American international air service in 1927 with scheduled runs between Key West, Fla., and Havana. The Fokker F-7 tri-motored land plane, with cruising speed of 90 mph, was used. The next most ambitious step was the 631-mile hop from Jamaica to the Canal Zone, 11 years ago, using the "Consolidated Commodore," the first twin-engined American flying boat.

In 1932, Pan American began to use the Sikorsky S-40, a four-engined ship designed from the airline's experiences. These ships carried 40 passengers on the Miami-Havana route, and their success demonstrated the value of the Caribbean, the "birthplace of

* District sales manager, Pan American Airways. Abstract of paper presented to the Southern California Section, June 5.

hurricanes," as a laboratory. From this operation has stemmed the company's Navigation Section which today is training 1850 navigators for the Army and RAF.

Trail blazing by plane, muleback, steamer and dugout canoe was an epic of aerial pioneering, and with the cooperation of Latin American governments, Pan American has replaced some 30,000 miles of airlines formerly controlled by the Axis nations.

The Martin Clipper (M-130), with a gross weight of 52,000 lb and a non-stop range of 2000 miles, came in 1935, a year after the company had begun its adventure westward with the 8683-mile route from the West Coast to Asia. Brilliant engineering achievements were marked up in developing the bases on Wake and Midway Islands—and despite the war 75% of all the mileage scheduled before Dec. 7 has been flown. This planning was the background to the valiant work of six unarmed transports which evacuated 5000 refugees and brought return loads of medicine and military supplies to the allied fighters in Burma.

Back in 1939 the "Yankee Clipper," the first Boeing B-314, headed from New York to Europe. It had a gross weight rating of 84,000 lb, or almost eight times that of the S-38 of 10 years before. But the outbreak of the World War II had upped traffic demand to 10 times the original estimates, so additional airplanes, changes in engines and propellers, and stripping every ounce of unneeded furnishings, equipment, and even paint, from the ships added tons to their payload capacities.

From Dec. 7 to June 5, more than 600 major overseas flight assignments had been completed. Ten of the Clipper captains have each logged 6 transatlantic crossings in 10 days, so heavy has been the demand for this service.

SAE Coming Events

Oct. 1-3

National Aircraft Production Meeting
(and Aircraft Engineering Display)
Hotel Biltmore - Los Angeles, Calif.

Oct. 7-8

War Transportation & Maintenance Meeting
(This meeting has been officially designated
as the Society's Semi-Annual Meeting for
1942)
Hotel Pennsylvania - New York

Oct. 22-23

National Fuels & Lubricants Meeting
Tulsa Hotel - Tulsa, Okla.

Dec. 8-9

Air-Cargo Engineering Meeting
(Auspices Chicago Section with cooperation
of SAE Aircraft and SAE Aircraft-Engine
Activities, Air Transport Association and
Aeronautical Chamber of Commerce)
Hotel Knickerbocker - Chicago

**Jan. 11-15,
1943**

War Production-Engineering Meeting (and
Engineering Display)
Book-Cadillac Hotel - Detroit, Mich.

Buffalo - Oct. 14

Marken Hotel; dinner 6:30 p.m. Trans-
port Flying - Dean C. Smith, director of
transport contracts, Airplane Division, Curtiss-
Wright Corp. Test Flying - Harold W.
Thomas, test pilot, assistant chief experimen-
tal pilot, Airplane Division, Curtiss-Wright
Corp.

Canadian - Oct. 21

Royal York Hotel, Toronto; dinner 6:30
p.m. Speaker to be announced.

Chicago - Oct. 13

Hotel Knickerbocker; dinner 6:45 p.m.
Increased Economy with Fuel and Tire Ra-
tioning - E. O. Wirth, chief engineer, and
A. H. Winkler, research engineer; Military
and Light Aircraft Carburetors, Bendix
Products Division, Bendix Aviation Corp.
Paper to be presented by A. H. Winkler.
Technical chairman - E. O. Wirth.

Cleveland - Oct. 12

Meeting at Cleveland Graphite Bronze Co.
plant, 16800 St. Clair Ave., Cleveland; din-
ner 6:45 p.m. Inspection trip 7:45 p.m.
Analysis and Methods of Manufacture of
Bearings from a Chemical and Physical Point
of View. Speakers - Ben F. Hopkins, presi-
dent, and other members of Cleveland
Graphite Bronze Co.

Detroit - Oct. 19

Horace H. Rackham Educational Memorial
Building. Aerial Photography - Col. George
W. Goddard, Wright Field. Also John S.
Bugas, Special Agent in charge Federal Bu-

Newest SAE Aeronautical Committee at Work



Organized on Aug. 21 at the request of the Engine Technical Committee of the Aeronautical Chamber of Commerce of America, the new SAE Special Committee on Cold Starting Requirements has several recommendations under way to enable starting aircraft engines under extremely low temperatures.

Storage temperatures as low as -60F are being encountered by the nation's armed forces. Among the problems being studied by the committee for early report are:

Standard diluents for the engine oil system and propeller gears, and shrouding and heating engines and parts pertinent to starting and immediate running.

Members of the committee, above, left to right: John H. Little, Chevrolet Division, General Motors Corp.; E. F. Webb, Chrysler Corp.; E. W. Rentz, Jr., SAE; Chairman C. R. Paton, Allison Division, General Motors Corp.; W. H. Sprengle, Pratt & Whitney Aircraft; Robert E. Johnson, Wright Aeronautical Corp.; B. J. Ryder, Lycoming Division, The Aviation Corp.

reau of Investigation, Detroit District. News-
reel by Vaughan Reid, president, City Pat-
tern Works.

Indiana - Oct. 15

Antlers Hotel, Indianapolis; dinner 6:45
p.m. Speaker - A. W. Herrington, chair-
man of the board, Marmon-Herrington Co.,
Inc., and president, SAE.

Northern California - Oct. 13

Fraternity Club, Palace Hotel, San Fran-
cisco; dinner 7:00 p.m. Aeronautic Meeting.
Speaker to be announced.

Oregon - Oct. 9

Meeting 8:00 p.m. at Consolidated
Freightways Plant, 2029 N. W. Quimby,

Portland. Fleet Maintenance - Shop Prac-
tices - Reclamation - Metal Spray. Speakers:
J. L. S. Snead, Jr., maintenance engineer,
P. W. Eaton, master mechanic, and J. L.
First, shop foreman, of Consolidated Freight-
ways, Inc.

Pittsburgh - Oct. 27

Mellon Institute. Speaker to be announced.

Southern California - Oct. 16 and 30

Oct. 16 - Hollywood Roosevelt Hotel, Los
Angeles; dinner 6:30 p.m. Subject - SAE
at War. Speakers to be announced.

Oct. 30 - Hollywood Roosevelt Hotel, Los
Angeles; dinner 6:30 p.m. Open Forum on
Fuels and Lubricants - Automotive and Air-
craft (exclusive of Diesel).

NEW MEMBERS Qualified

These applicants who have qualified for admission to the Society have been welcomed into membership between Aug. 15, 1942, and Sept. 15, 1942.

The various grades of membership are indicated by: (M) Member; (A) Associate Member; (J) Junior; (Aff.) Affiliate Member; (SM) Service Member; (FM) Foreign Member.

Baltimore Section

Finkler, Irving Henry (J) assistant engi-
neer, U. S. Army, War Department, Aber-
deen Proving Ground, Aberdeen, Maryland
(mail) 13 Defense Dr.

Canadian Section

Doyle, J. Rowland (J) layout draftsman
and checker, General Motors of Canada,
Ltd., Engineering Department, Oshawa, Ont.

Sims, A. G. (M) supervisor, engine over-
haul division, Department of Munitions &
Supply, Ottawa, Ont. (mail) Apt. 108, May
Fair Apts.

Williams, A. Wesley (A) salesman, Link-
Belt, Ltd., Toronto, Ont. (mail) 791 Eastern
Ave., Toronto 8, Ont.

Chicago Section

Webber, Earl N. (A) president, Joseph
Weidenhoff, Inc., 4344 W. Roosevelt Rd.,

Chicago (mail) 942 Keystone Ave., River Forest, Ill.

Cleveland Section

Brown, Spencer D. (J) assistant factory manager, Harris Products Co., 5105 Cowan, Cleveland.

Cox, William, Jr. (M) president, Elco Grease & Oil Co., Jennings Rd. & Denison Ave., Cleveland.

Hawley, Myron (J) engineering department, group leader, hydraulics, Goodyear Aircraft Corp., Akron Municipal Airport, Akron, Ohio (mail) 22 Rhodes Ave.

Lucas, Julius A. (J) development engineer, Goodyear Tire & Rubber Co., Akron, Ohio (mail) 944 Mayfair Rd.

Peskin, Leonard C. (M) director of spring mill products, American Steel & Wire Co.,

Rockefeller Bldg., 614 Superior Ave. N. W., Cleveland.

Detroit Section

Aland, Richard C. (M) engineering checker, Bromley Engineering Co., 4612 Woodward Ave., Detroit (mail) Whitmore Lake, Mich.

Beechler, J. S. (A) special sales representative, Ranco, Inc., 601 W. Fifth Ave., Columbus, Ohio (mail) 18980 Sussex Ave., Detroit.

Harley, J. W., Jr. (J) chief liaison engineer, Owosso Division, Bendix Aviation Corp., Corunna Ave., Owosso, Mich.

Jacobson, Harry R., Capt. (S M) U. S. Army, Ordnance Department, Procurement Division, Production Facilities Branch, Room 2102 - Buhl Building, Detroit.

Jeffers, Robert Herbert (J) time study man, Cadillac Motor Car Division, General Motors Corp., Detroit (mail) 1338 Nottingham, Grosse Pointe, Mich.

Kasten, Walter (M) chief engineer, Skinner Purifiers, Inc., 1349 E. Milwaukee, Detroit (mail) Box 184, Franklin, Mich.

Maas, Benard L. (A) sales manager, Broderick Forge Co., Muncie, Ind. (mail) 731 Fisher Building, Detroit.

Oddy, Edward P. (M) divisional superintendent, McCord Radiator & Mfg. Co., 2587 E. Grand Blvd., Detroit (mail) 18481 Appoline Ave.

Raviolo, Victor G. (M) project engineer, Ford Motor Co., Dearborn, Mich. (mail) 15773 Cheyenne, Detroit.

Tallberg, Valentine Y. (M) engineer, Ford Motor Co., Engineering Department, Dearborn, Mich.

Watkins, George Benson (M) director of research, Libbey-Owens-Ford Glass Co., 1701 E. Broadway, Toledo, Ohio.

Indiana Section

Golden, L. Duke (M) sales engineer, Perfect Circle Co., Hagerstown, Ind. (mail) 300 N. Easthaven Ave., Richmond, Ind.

Goldthwaite, John L. (M) engineer, Allison Division, General Motors Corp., Indianapolis.

Kansas City Section

Chisholm, P. J. (M) production superintendent, Keystone Trailer & Equipment Co., 150 Guinotte, Kansas City, Mo.

Metropolitan Section

Bell, Kenneth D. (J) junior test engineer, Wright Aeronautical Corp., Division of Curtiss-Wright Corp., Paterson, N. J. (mail) 816 Valley Rd., Upper Montclair, N. J.

Demarest, Edwin J. (A) senior procurement inspector, U. S. Army Air Forces, Eastern District, Wright Aeronautical Corp., Paterson, N. J. (mail) 61 Clark St.

Kutzelman, George F. (A) instructor, Saunders Trade School, Yonkers, N. Y. (mail) 7447 65th St., Glendale, L. I., N. Y.

Maloney, Joseph G. (J) research, Wright Aeronautical Corp., Division of Curtiss-Wright Corp., Paterson, N. J. (mail) 456 Overbrook Rd., Ridgewood, N. J.

Mills, Hugh A. (J) research engineer, Norma-Hoffmann Bearings Corp., Stamford, Conn. (mail) White Oak Shade Rd., New Canaan, Conn.

Purdy, Robert W. (J) detailer, Ranger Aircraft Engines, Division of Fairchild Engineering & Airplane Corp., Farmingdale, L. I., N. Y. (mail) 10 William St., Baldwin, L. I., N. Y.

World Bestos Corp. (Aff.) 52 Cortland St., Paterson, N. J.; Reps: Sisson, Homer B., Sales Engineer, Detroit; Spicer, Donald H.

Northern California Section

Macpherson, John Hugh, Jr. (J) research engineer, Standard Oil Co. of Calif., Richmond, Calif. (mail) 1416 Richmond St., El Cerrito, Calif.

Olsen, G. A. (A) vice president, general manager, Sunland Refining Corp., P. O. Box 1512, Fresno, Calif.

Smith, Elbert Clayton (M) director, engineering training, U. S. Army, Sacramento Air Depot, McClellan Field, Calif. (mail) 1645 Arcade Blvd., North Sacramento, Calif.

Wilkes, B. Furman (J) junior research engineer, Shell Development Co., Emeryville, Calif. (mail) 2230A Jefferson Ave., Berkeley, Calif.

Northwest Section

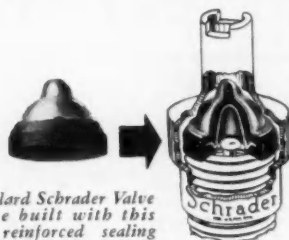
Fruchauf, Herman P. (A) production foreman, Kenworth Motor Truck Corp., Seattle, Wash. (mail) 6611 Aurora Ave.

Park, Robert Hatherley (A) president,



THE ROAD TO VICTORY IS NO PLACE FOR A "FLAT"

A flat tire can delay the movement of troops, weapons or supplies. It can be the cause of wasting perishable foods, or it can keep war workers from their vital jobs. Today, if a flat results from preventable causes, it is carelessness of the most serious kind. Flat tires due to valve leakage are preventable. Air cannot escape through tire valves sealed with air-tight Schrader Valve Caps. The road to Victory is no place for a flat. Be sure the valves you service are sealed with air-tight Schrader Caps.



All Standard Schrader Valve Caps are built with this doubly reinforced sealing unit. Guaranteed air-tight up to 250 lbs. pressure.

Schrader

VALVE CAPS

GUARDIANS OF THE AIR
THAT HELP SAVE RUBBER

A. SCHRADER'S SON, Division of Scovill Manufacturing Company, Inc., BROOKLYN, N. Y.

R. H. Park Mfg. Co., Auburn, Wash.

Peterson, Lewis H. (A) sales engineer, Kenworth Motor Truck Corp., Seattle, Wash. (mail) 213 W. Comstock.

Strain, Lamar A. (A) vice president, Strain's Garage, Kent, Wash.

Oregon Section

Saunders, William Alexander (M) lubrication and gasoline engineer, Inland Empire Refineries, Inc., Box 6188, Spokane, Wash. (mail) P. O. Box 162, Oak Grove, Ore.

Strong, Emory M. (M) assistant mechanical engineer, Bonneville Power Administration, Portland, Ore. (mail) Route 4, Box 111-C, Vancouver, Wash.

Philadelphia Section

Willis, Harry E. (A)* maintenance superintendent, Northland Petroleum Transport Co., Manheim Pike, Lancaster, Pa. (mail) P. O. Box 1034.

Pittsburgh Section

James, Louis Edward (A) sales engineer, Standard Oil Co. of Pa., Broad & Chestnut Sts., Philadelphia, Pa. (mail) 1535 Napoleon St., Pittsburgh, Pa.

St. Louis Section

Root, Robert E. (J) junior layout draftsman, Emerson Electric Mfg. Co., 1824 Washington Ave., St. Louis, Mo. (mail) 5779 Floy Ave.

Wich, John A. (J) engineer, Busch-Sulzer Bros. Diesel Engine Co., 3300 S. Second St., St. Louis, Mo. (mail) 4937 Lotus Ave.

Southern California Section

Boeck, Percy A. (A) manager, western division, Oakite Products, Inc., 22 Thomas St., New York (mail) 1001 E. First St., Los Angeles, Calif.

Chalkley, William J., Lt. (S M) P. O. Box 126, Niland, Calif.

Dilworth, Joseph Edward (A) Adel Precision Products Corp., 10777 Van Owen St., Burbank, Calif. (mail) 435 Ivy St., Glendale, Calif.

Hokanson, Evert C. (M) manager, west coast branch, Whiting Corp., Aviation Department, 6381 Hollywood Blvd., Los Angeles.

Jones, H. Albert (M) methods engineer, cost and sales, Harvill Aircraft Die Casting Corp., 6251 W. Gentry Blvd., Los Angeles, Calif. (mail) 718 Larch St., Inglewood, Calif.

Montague, Kenneth E. (J) aeronautical engineer, Consolidated Aircraft Corp., San Diego, Calif. (mail) 2164 Albatross.

Sakaly, John Edwin (J) engineering draftsman, U. S. Rubber Co., Department 32, Los Angeles, Calif. (mail) 443 E. 75th St.

Southern New England Section

Sutherland, Edward A. (J) experimental test engineer, Pratt & Whitney Aircraft, Division of United Aircraft Corp., East Hartford, Conn. (mail) 133 Main St., Manchester, Conn.

Southwest Group

Scoggin, Baxter I., Jr. (M) manager, research and development, Anderson-Prichard Oil Corp., 1000 Ramsey Tower, Oklahoma City, Okla.

Outside of Section Territory

Boyle, F. J., Lt. (jg) USNR (J) Naval Air Station, Kodiak, Alaska.

Bradshaw, Rudy L. (M) Civilian Conservation Corps, Motor Repair Division, 2750 State St., Salem, Ore. (mail) Covey Apts., Apt. 402, 239 E. South Temple St., Salt Lake City, Utah.

Casler, William A. (J) research engineer, Caterpillar Tractor Co., Peoria, Ill. (mail) 633 Moss Ave.

Fox, Elton B. (J) research engineer, Caterpillar Tractor Co., Peoria, Ill. (mail) 621 Sherman Ave.

Hayes, James C., Lt. (A) U. S. Army, Air Forces, Air Base, Albuquerque, N. Mexico.

Johnston, William Henry, Lt. (J) engineering officer, U. S. Army, Air Forces, 73rd Observation Squad., Godman Field, Fort Knox, Ky.

Mawdsley, David William (A) garage foreman, Consolidated Mining & Smelting Co., Trail, B. C., Canada (mail) 101 Aldridge Ave.

Nash, Donald Frederick (J) mechanic, MacKenzie Air Service, Ltd., Airport Divi-

sion, Edmonton, Alta., Canada (mail) 3009 17th St., S. W., Calgary, Alta., Canada.

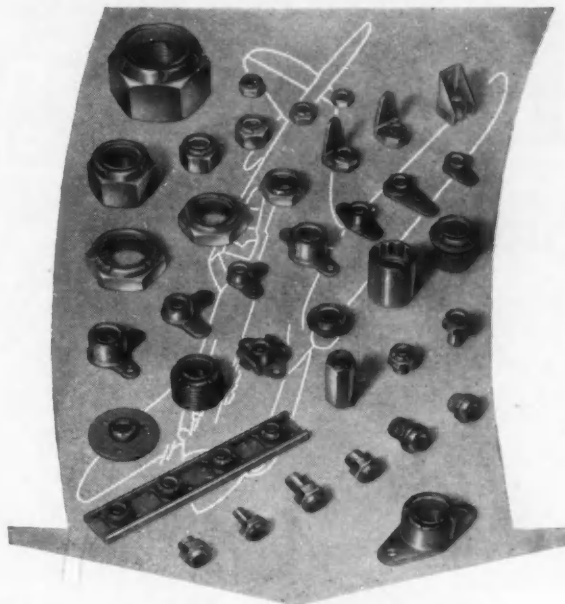
Pearce, Charles F. (A) partner, Aeronautical Engine Division, Standard Machine Works, St. James, Man., Canada (mail) 660 St. Matthews Ave., Winnipeg, Man., Can.

Pence, F. A. (A) northwestern representative, Sun Oil, 1403 Foshay Tower, Minneapolis.

Foreign

Chaplin, Herbert Eugene (F M) chief designer, Fairey Aviation Co., Ltd., Hayes, Middlesex, England.

Larrabure, Louis J. Kirchhofer (F M) chief engineer, Inspectoria Technica do Instituto do Acucar, E do Alcool, Sao Paulo, Brasil (mail) Rua Salto 82.



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APPLICATIONS Received

The applications for membership received between Aug. 15, 1942, and Sept. 15, 1942, are listed below. The members of the Society are urged to send any pertinent information with regard to those listed which the Council should have for consideration prior to their election. It is requested that such communications from members be sent promptly.

Buffalo Section

Quinzio, John R., designer, Columbus-McKinnon Chain Corp., Tonawanda, N. Y.

Chicago Section

Breitsameter, Frank J., ordnance inspector, U. S. Army, Chicago Ordnance District, Chicago.

Cerveney, Frank E., development engineer, Crane Co., Chicago.

McGrane, Donald C., supervising inspector, U. S. Navy, Naval Material, Chicago.

Miller, Royal A., technical director, Illinois Farm Supply Co., Chicago.

Salter, Robert M., Jr., junior instructor, aircraft engines, U. S. Navy, Chicago.

Wing, Donald Wilkie, assistant foreman and instructor, International Harvester Co., Inc., Chicago.

Cleveland Section

Abramoska, Alfred A., chief engineer, Weatherhead Co., Cleveland.

Adams, Harry Lloyd, estimate supervisor, Weatherhead Co., Cleveland.

Allen, William S., assistant production engineer, Weatherhead Co., Cleveland.

Aufmuth, George W., tool design and checker, Weatherhead Co., Cleveland.

Bellman, Donald R., junior mechanical engineer, National Advisory Committee for Aeronautics, Cleveland Airport, Cleveland.

Branstrom, Frank O., tool engineer, Weatherhead Co., Cleveland.

CConnell, James F., chief draftsman, Weatherhead Co., Cleveland.

Crankshaw, Edwin, assistant chief engineer, mechanical division, Cleveland Graphite Bronze Co., Cleveland.

Crawley, Charles H., production engineer, Weatherhead Co., Cleveland.

Earhart, Richard H., chief, subcontracting division, Weatherhead Co., Cleveland.

Hertel, William A., checker and production engineer, Weatherhead Co., Cleveland.

Horton, Lester M., draftsman and checker, Weatherhead Co., Cleveland.

Kimmel, Paul B., purchasing agent, Weatherhead Co., Cleveland.

Koss, Victor T., draftsman, Jack & Heintz, Inc., Bedford, Ohio.

Kuss, Ralph L., general manager, American Coach & Body Co., Cleveland.

King, Lewis O., estimator, Weatherhead Co., Cleveland.

Lennox, R. A., sales engineer, Weatherhead Co., Cleveland.

Marsh, Edred Thomas, Sr., mechanical engineer, National Advisory Committee for Aeronautics, Cleveland Airport, Cleveland.

Meek, William Edwin, industrial engineer, Thompson Products, Inc., Cleveland.

Park, Bryan, manager of maintenance, Central Greyhound Lines, Cleveland.

Parks, John R., forging engineer, Weatherhead Co., Cleveland.

Posavac, James, squad leader, Weatherhead Co., Cleveland.

Rentz, Andrew John, chief inspector, Weatherhead Co., Cleveland.

Roddie, John, chief draftsman, tool design, Weatherhead Co., Cleveland.

Szitar, John Edward, Jr., products engineer, Weatherhead Co., Cleveland.

Voerch, Stephen, chief draftsman, Bendix-Westinghouse Automotive Air Brake Co., Elyria, Ohio.

Winner, Warren R., assistant chief draftsman, Weatherhead Co., Cleveland.

Dayton Section

Friedman, Martin H., structures engineer, Curtiss-Wright Corp., Columbus, Ohio.

Parkin, Don, aircraft representative, Tube

Turns, Inc., Louisville, Ky. Mail: Van Cleave Hotel, Dayton.

Place, Philip W., test engineer, Superior Engine Division, National Supply Co., Springfield, Ohio.

Mohan, William P., leadman, carburetion inspector, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Lockland, Ohio.

Small, George E., engineer, Universal Cooler Corp., Marion, Ohio.

Detroit Section

Adams, George Eugene, layout engineer, Briggs Mfg. Co., Detroit.

Bradshaw, Charles F., liaison engineer, Bendix Products Division, Bendix Aviation Corp., Owosso, Mich.

Brown, William J., chief engineer, U. S. Government, Tank Engineering Office, Detroit.

Burnell, J. Barrett, draftsman, Chevrolet Central Office, division of General Motors Corp., Detroit.

Davidson, James H., field expeditor, Timken-Detroit Axle Co., Detroit.

Fitzpatrick, Arthur M., designing engineer in charge of production illustration, Stinson Aircraft Division, Vultee Aircraft, Inc., Wayne, Mich.

Glassford, Gordon L., technical service engineer, Yellow Truck & Coach Mfg. Co., Pontiac, Mich.

Highley, Frank H., chief engineer, spark plug engineering laboratory, Firestone Rubber & Metal Products Co., Wyandotte, Mich.

Juvinall, Robert C., project engineer, Chrysler Corp., Highland Park, Mich.

Klein, Bruce William, head, experimental data section, Pontiac Motor Division, General Motors Corp., Pontiac, Mich.

Mather, George Lowell, draftsman, Ford Motor Co., Dearborn, Mich.

Maxey, Joel W., test engineer, Ford Motor Co., Dearborn, Mich.

Merta, Victor Leo, junior metallurgical engineer, Research Laboratories Division, General Motors Corp., Detroit.

Metzler, Paul D., test engineer, General Motors Corp., Milford, Mich.

Ozker, Sacid Mehmet, mechanical engineer, 1016 S. Lafayette, Royal Oak, Mich.

Russell, Harry L., aircraft inspector, Briggs Mfg. Co., Detroit.

Zenker, Richard L., test engineer, Packard Motor Car Co., Detroit.

Indiana Section

Gustafson, John Raymond, chief engineer, Muehlhausen Spring Corp., Logansport, Ind.

Hansen, Harold S., junior test engineer, Allison Division, General Motors Corp., Indianapolis.

Yekta, Parvis A., mechanical engineer, Marmon-Herrington Co., Inc., Indianapolis.

Kansas City Section

Smith, Homer J., manager, lubrication and grease department, Consumers Cooperative Association, Kansas City, Mo.

Metropolitan Section

Andrews, Jack Frost, chief inspector, Titeflex Metal Hose Co., Newark, N. J.

Berry, Sam C., engineering trainee, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Cornish, Donald Cross, test engineer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Crawford, Farold R., auto and body inspector, U. S. Army, Signal Corps, General Development Laboratories, Fort Monmouth, N. J.

Doane, John H., quality control, Titeflex Metal Hose Co., Newark, N. J.

Edwards, Austin S., Jr., engineering trainee, Wright Aeronautical Corp., division

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Aircraft Engineering

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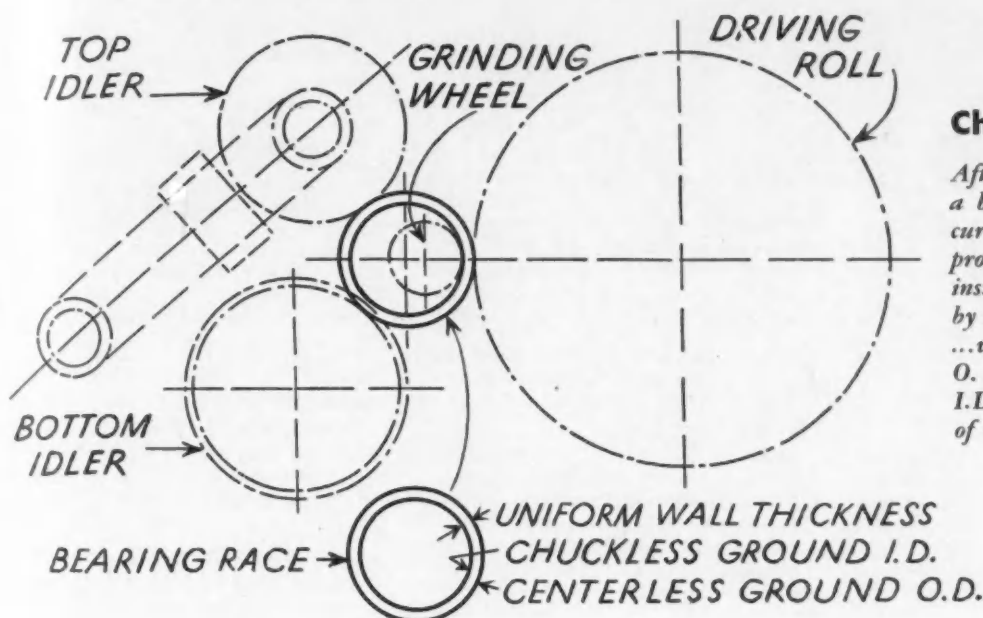
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(Concluded from page 38)

of Curtiss-Wright Corp., Paterson, N. J.
Feldman, Howard, draftsman, Snead & Co., New York City.

Fenn, Russell L., Jr., experimental engine tester, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Fuller, Frederic Edwin, chief stress analyst, Ranger Aircraft Engines, Farmingdale, L. I., N. Y.

Gass, Andrew J., methods engineer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Koerwer, Richard John, engineering trainee, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Ladd, George T., assistant project engineer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Lee, Lucien On, engineer, Morey Machinery Co., Inc., Astoria, L. I., N. Y.

Leroe, Bernard W., design draftsman, Titeflex Metal Hose Co., Newark, N. J.

Lewis, George Glen, junior engineer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Mills, Malcolm E., assistant standards engineer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Mullis, Clyde M., engineering trainee, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Munger, William Pattee, engineering trainee, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Nelson, Frederick L., laboratory assistant, Socony-Vacuum Oil Co., Inc., Brooklyn, N. Y.

Pecker, Leo S., assistant engineer, B. G. Corp., New York City.

Perrin, Joseph, test engineer, Simmonds Aerocessories, Inc., L. I. C., N. Y.

Phillips, John J., project engineer, Titeflex Metal Hose Co., Newark, N. J.

Rifenbergh, C. Moran, physicist, International Telephone & Radio Mfg. Corp., New York City.

Russell, Hayden B., president, Aero-Units, Inc., and treasurer, General Engineering & Mfg. Corp., Newark, N. J.

Thompson, Neil L., engineering trainee, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Walton, O. Alarik, machinist, tool designer, Grumman Aircraft Engineering Corp., Bethpage, L. I., N. Y.

Wenger, John Richard, engineering trainee, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Welsh, Frank R., design draftsman, Titeflex Metal Hose Co., Newark, N. J.

Milwaukee Section

Beulke, Gordon W., assistant chief engineer, Twin Disc Clutch Co., Racine, Wis.

Clem, John M., engineer, Fairbanks, Morse & Co., Beloit, Wis.

Crosier, Claude C., service engineer, The Torrington Co., Torrington, Conn. Mail: 1324 W. Wisconsin Ave., Milwaukee.

Hopkins, R. Bruce, tractor engineering, Allis-Chalmers Mfg. Co., West Allis, Wis.

Mather, Joseph Merrill, liaison engineer, Allis-Chalmers Mfg. Co., Milwaukee.

New England Section

McCarthy, Charles F., treasurer, McCarthy Freight System, Inc., Taunton, Mass.

Smith, Eben N., New England manager, United Motors Service, Inc., Boston.

Northern California Section

Dorcich, Roy Louis, MacMillan Petroleum Corp., Los Angeles. Mail: 134 3rd St., Salinas, Calif.

Frank, Arnold J., flight test engineer, Consolidated Aircraft Corp., San Diego, Calif. Mail: 5706 Ayala Ave., Oakland, Calif.

Lewis, Harry Raymond, aviation cadet,

USNR., U. S. Naval Air Station, Corpus Christi, Texas. Mail: 978 Heasperian Blvd., San Leandro, Calif.

MacNeill, John H., 2nd Lt., U. S. Army, Ordnance Department, Oakland, Calif.

Northwest Section

Williams, Henry Norwood, shop foreman, Auto Interurban Bus Co., Spokane, Wash.

Oregon Section

Hammill, E. Ogden, assistant secretary and treasurer, Automotive Products, Inc., Portland.

Leslie, Frank M., personnel manager, materials coordinator, Pointer-Willamette Trailer Equipment Co., Portland.

Osterman, Clarence, fuel injection serviceman, Automotive Products, Inc., Portland.

Philadelphia Section

Young, Frank C., supervisor of equipment, transportation, New Jersey State Highway Dept., Trenton, N. J.

Pittsburgh Section

Pfeiffer, Walter H., principal automotive advisor, U. S. Army, 29th Division, Camp Blanding, Fla. Mail: 41 Waldorf St., Pittsburgh.

Weber, Theodore R., chief mechanical engineer, Railway Steel-Spring Division, American Locomotive Co., Latrobe, Pa.

St. Louis Section

Dobeus, V. M., chief engineer, Allis-Chalmers Mfg. Co., Springfield, Ill.

Southern California Section

Carroll, John E., president, Signal Trucking Service, Ltd., Los Angeles.

Bozeman, Howard D., chief automotive advisor, U. S. Army, Headquarters II, Armored Corps, A.P.O. No. 352, Camp Young, Indio, Calif.

Collins, Frank Thomas, stress analysis engineer, Douglas Aircraft Co., Inc., Long Beach, Calif.

Collins, Michael Daniel, technician, The General Tire & Rubber Co., Akron, Ohio. Mail: 312 North Nicholas, Fullerton, Calif.

Gage, Charles Leslie, junior engineer, Douglas Aircraft Co., Inc., El Segundo, Calif.

Hagar, Edward F., design engineer, Vega Aircraft Corp., Burbank, Calif.

Hall, T. H., chief development engineer, Consolidated Aircraft Corp., San Diego, Calif.

MacDougall, Allan Elliott, production engineer, United Aircraft Products, Inc., Los Angeles.

Rose, Dale C., Sr., production engineer, United Aircraft Products, Inc., Vernon, Calif.

Saks, Andrew, profiler operator, North American Aviation, Inc., Inglewood, Calif.

Sanborn, Daniel S., engineer, Ryan Aeronautical Co., San Diego, Calif.

Smith, F. Allyn, chief design engineer, Vega Aircraft Corp., Burbank, Calif.

Tatman, Clyde, field service engineer, Cummins Engine Co., Columbus, Ind. Mail: 2042 Redcliff St., Los Angeles.

Southern New England Section

Ely, Roland S., experimental test engineer, Pratt & Whitney Aircraft, division of United Aircraft Corp., East Hartford, Conn.

Katz, Edwin F., draftsman, Pratt & Whitney Aircraft, division of United Aircraft Corp., East Hartford, Conn.

Ketcham, Bruce Valentine, designer, Pratt & Whitney Aircraft, division of United Aircraft Corp., East Hartford, Conn.

Krause, Wilford L. F., motor maintenance and design, United Illuminating Co., New Haven, Conn.

Parker, Rayford R., assistant service manager, Diesel division, American Bosch Corp., Springfield, Mass.

Thacher, Alfred B., assistant project engineer, Hamilton Standard Propellers, division

of United Aircraft Corp., East Hartford, Conn.

Syracuse Section

Burkhardt, H. L., chief engineer, Ruckstall-Burkhardt Engineering Co., Elmira, N. Y.

Texas Group

Archibald, Henry Thomas, general auto advisor, U. S. Army, 7th Motor District, 8th Service Command, Fort Bliss, Texas.

Breit, C. A., mechanical engineer, Houston Electric Co., Houston, Texas.

Halpenny, Lloyd J., general group leader, Consolidated Aircraft Corp., Fort Worth, Texas.

Rose, Joseph G., III, tool planner, North American Aviation, Inc., Dallas.

Sharp, Charles S., district manager, Thompson Products, Inc., Dallas.

Smithson, C. Hubert, service liaison engineer, Guiberson Diesel Engine Co., Dallas.

Switzer, B. D., materials engineer, Consolidated Aircraft Corp., Fort Worth, Texas.

Trail, James Arthur, sales engineer, Hyatt Bearings Division, General Motors Corp., Chicago, Ill. Mail: 8712 Canyon Drive, Dallas.

Williams, James R., research assistant, Guiberson Diesel Engine Co., Dallas.

Washington Section

Corwin, Richard F., Ensign USNR, Navy Department, Aeronautical Board, Washington, D. C.

Rogatnick, Joseph H., assistant liaison officer, Office of Lend-Lease Administration, Washington, D. C.

Outside of Section Territory

Billings, Edgar I., general salesman, Socony-Vacuum Oil Co., Inc., Albany, N. Y.

Breckenridge, R. H., mechanical engineer, General Electric Co., Schenectady, N. Y.

Deese, Harry, superintendent maintenance, Jack Cole Co., Inc., Birmingham, Ala.

Finout, Guy E., Jr., Sgt., U. S. Army, c/o A. P. O., 876, Miami, Fla.

Friedle, Roy A., president and general manager, Hancock Truck Line, Inc., Evansville, Ind.

Garringer, Donald W., automotive inspector, U. S. Army, Signal Corps, General Development Laboratories, Fort Monmouth, N. J. Mail: R. R. No. 2, Chillicothe, Ohio.

Hart, R. Henry, Jr., president, Hart's Automotive Parts Co., Chattanooga, Tenn.

Hayes, George Thomas, Lt., U. S. Navy, Naval Air Station, Pensacola, Fla.

Hopkins, William Rogers, chief experimental engineer, Lycoming Division, The Aviation Corp., Williamsport, Pa.

Johnson, William George, designer, Caterpillar Tractor Co., Peoria, Ill.

Larson, Hilmer E., maintenance superintendent, Pacific Intermountain Express, Salt Lake City, Utah.

Rawlings, Leslie M., test engineer, Lycoming Division, The Aviation Corp., Williamsport, Pa.

Reel, Ralph M., superintendent, The Pharis Tire & Rubber Co., Newark, Ohio.

Richards, Howard J., engineer, Freightways Mfg. Co., Salt Lake City, Utah.

Schneider, Irving, design engineer, Snead & Co., Orange, Va.

Smith, John H., Jr., vice president, Atlantic Trucking Co., Inc., Huntington, W. Va.

Sturgeon, John F., chemical engineer, Root Petroleum Co., El Dorado, Arkansas.

Tomkinson, Earl S., layout draftsman, Caterpillar Tractor Co., Peoria, Ill.

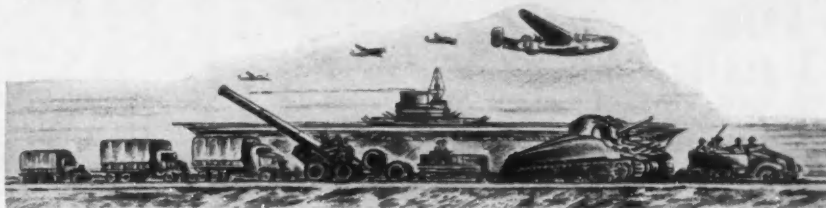
Foreign

Bia, Jacques, chief technical service, Compagnie du Kasaie, Dima, Belgian Congo, Africa.

Tucker, Stephen Lloyd, managing director, Tucker & Co., Ltd., Colombo, Ceylon, India.

SAE JOURNAL *Pre-Prints*

THE SOCIETY
OF
AUTOMOTIVE
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News of the
DECEMBER
Issue

By Norman G. Shidle

"Lydia Pinkhams"

LIKE other veteran editors, we've had our share of bouquets and brickbats. We've had our publications praised to the sky, damned with faint praise, and just plain kicked in the teeth. We've had to learn that it is the percentage which counts in the long run, rather than the vigor of the particular comment—and we've learned that good editing means watching and being guided by the percentages.

One kind of letter to the editor, though, means a great deal in itself; that is the letter which shows *understanding* on the part of the writer of what the publication is trying to achieve. The letter whose writer is objective, as well as subjective, in his viewpoint.

... Like the one we got the other day from the research engineer of the aircraft division of an important piston ring company—a man in many ways a typical SAE Journal reader. . . . "I am sure," he wrote, "I am expressing the opinion of a large percentage of SAE members when I tell you that I feel you are doing an excellent job in fitting the material in the SAE Journal to wartime engineering conditions. I look forward to and read each issue with a great deal of interest."

Fitting the SAE Journal to wartime engineering conditions has been the Number 1 objective of the SAE Journal staff, the Publication Committee, and its various readers committees ever since the Society established its War Activity Council way back in June, 1940. So, naturally, this particular letter pleased everyone more than a little.

It is only fair to say that our editorial mail has grown larger in re-

RADIO IGNITION-SYSTEM RIVALRY IS NEUTRALIZED BY ENGINEERS

NCESSITY for clear and uninterrupted communication between war planes and control headquarters on land and sea, so essential to modern combat, is putting engineers to work solving the problem of electrical interference both with radio communication and with navigation. The whole electrical system of a modern airplane is a potential and actual offender, yet impossible of elimination because the plane cannot fly without it.

Progress in eliminating radio interference difficulties in planes will be reviewed in the December SAE Journal by D. W. Randolph, of Apex Electrical Mfg. Co. Mr. Randolph

indicts the ignition system as the greatest source of interference with all wave lengths, and explains that the principal problem is to shield high-tension circuits so that they will not interfere with the radio, yet will provide adequate insulation under severe conditions.

Unit design of ignition systems so that shielding, insulation, generator, and spark plugs work together is said to afford hope for maximum efficiency and freedom from trouble. Other aids include the use of low-resistance joints with machined bearing surfaces of adequate area, and locating grounding points not more than 18 in. apart.

Field of Bearing Corrosion Awaits Further Explorations

ONE continent still awaiting thorough scientific exploration is the corrosion of bearings in internal-combustion engines. Such trails as have been blazed have led chiefly to unexplored areas concealing certain knowledge of reasons for erratic behavior of engine bearings, particularly in severe operation.

Graphic story of preliminary exploration will be told by Leonard Raymond, of the Tide Water Associated Oil Co.'s automotive laboratory, in the December issue of the SAE Journal.

Initial work has revealed that bearing corrosion is reduced by increasing the fineness of the microstructure, that all bearings are benefited by reduction of operating temperatures, and that special processes, such as indium plating, greatly improve corrosion resistance.

Engine tests of as much as 500 hr duration made with various oils disclosed that fine-structure copper-lead, cadmium-nickel, and hardened high-lead bearings, all superior to babbitt in fatigue strength under high loads and temperatures, resist corrosion substantially better than coarse-structure bearings. Yet correlated reports of service experience indicated that bearing failures still

are erratic, being confined to no one type of oil, bearing, or service.

It is believed that correlation of additional data on individual operating variables will enable investigators to plot the response of an oil or a bearing to such changes and to obtain a composite picture of changes in behavior with operating factors. Until this can be done, Mr. Raymond recommends that engine manufacturers reduce the burden on oil and bearings by improving design and materials, thereby increasing the number of oils which lubricate their engines satisfactorily; that oil refiners continue to develop lubricants more resistant to increased severity of operation.

In the
December
SAE JOURNAL

The
SAE National
Fuels & Lubricants

Meeting

will be reported

cent months—and that our "percentage" is on the up and up, too. . . . and having that off our chest, we promise not to talk about ourselves again for many, many months to come.

Rings, Oil Key Needs in High Speed Diesels

AMONG many accomplishments of automotive engineers about which little is heard, and even less seen, is the engineering of piston rings to meet the increasingly tough requirements of operation of high-speed automotive and marine diesel engines which work at 1500 rpm and up. Although the high-speed diesel has been considered as something of a "problem child" in the power field; engineers now contend that operation can be satisfactory if correct oils are used and the piston rings properly engineered to the job.

The effect of oils and piston rings upon high-speed diesel engine operation will be discussed in the December issue of the SAE Journal by Paul S. Lane, of the Muskegon Piston Ring Co., and Stuart Nixon, of the Sealed Power Corp. They list a large number of high-speed diesel problems and suggest the solutions.

They insist that properly designed and located piston rings will give satisfactory service without breaking, ring sticking, or excessive wear; recommend that engines be operated as nearly as possible at uniform speeds; and insist that the fuel and injection system, the air and oil filters, and other parts of the engine be given regular care at all times, with more frequent attention when the engine is operated under severe conditions.

Slide Rule Joins Siege Gun for Wartime Service

GIVE a powerplant engineer a formula like this: $WsB = Ws \times \frac{AsB}{As}$, and he has a head start on solving the problem of ascertaining the capacities of cross-flow intercoolers, oil coolers, or radiators which must be installed in a combat plane to assure satisfactory performance under extreme conditions.

That one formula is only the beginning, of course. There are 32 other symbols which can be employed in an infinite number of formulas to get an answer which may appear, on paper, to be merely some figures, but which actually may be the difference between success and failure of air attack or defense on the other side of the world—or right here at home!

A practical engineering-aid article by Paul A. Scherer, of AiResearch Mfg. Co., to appear in the December SAE Journal, will tell the plain, simple story in the form of an

outline of simple and rapid methods for determining the performance of cooler equipment for planes, and for determining the size of a cooler needed for any set performance. Although the article was not prepared primarily to win battles and influence conflicts, it is one more indication that in mechanized warfare the slide rule is as mighty as the siege gun.

Engineers Attack Diesel BO; Seek End of Smell and Smoke

DIESEL-POWERED equipment is going through the same initial difficulties as its predecessor, the automobile, which first repelled an incredulous public by its smoke, odor, noise, and erratic behavior; then, suddenly turning acceptably smokeless, odorless, noiseless, and reliable, it became a public favorite. Many of the difficulties already

have been overcome in the case of diesel trucks and buses, but a neat yet complicated engineering problem remains—to eliminate exhaust smoke and odors without simultaneously losing the diesel attributes—power and economy.

No one fuel seems to produce all desirable results, even with recourse to additives. Current remedy is to use selected tailor-made fuels which, designed to meet specific operating requirements and to suit the type and mechanical condition of equipment, compromise various advantages and disadvantages.

Hope that future engine design will obviate necessity for tailor-made fuels and precise maintenance practice is voiced in the comprehensive article by R. S. Wetmiller, of The Texas Co., and Capt. L. E. Endsley, Jr., of U. S. Army Engineers, to be published in the December SAE Journal. They will define the problems remaining, point trends, and report results of a series of interesting tests.

Railroads Trade Designs for Comfort with Motor Vehicles

RAILWAY passenger coaches mounted on soft coil springs and rubber, and fitted with hydraulic shock absorbers; which roll inward on the curves and are comfortably free from vibration at speeds up to 100 mph; which prove that weight is not essential to riding comfort; and which are acoustically treated to deaden operating noises—are among the latest products of research.

The designers say the idea for the car, which has won the enthusiastic approval of 90% of the passengers invited to become guinea pigs of an experiment in railway comfort, was borrowed from the design of passenger automobiles. They contend the design is so satisfactory that it should now be adapted for use on motor buses.

This railway-highway exchange of designs and devices for passenger comfort will be outlined by Paul K. Beemer, chief engineer, and F. C. Lindvall, consulting engineer, both of the Pacific Railway Equipment Co., in the December SAE Journal.

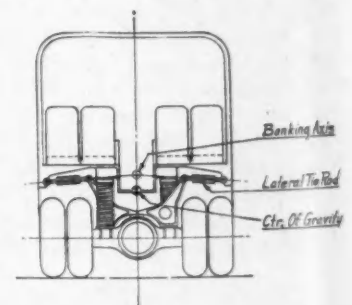
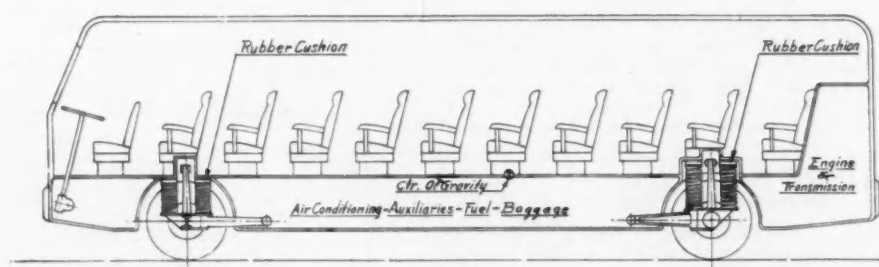
They describe this new railway car of pendulum type, with above-gravity suspension, as being mounted on vertical helical springs—eight to a truck—recessed into the car structure on either side of the center aisle. Lateral movement of the car body as it floats on the main springs is restrained by control arms and links mounted in rub-

ber. Hydraulic shock absorbers are connected to the body structure by vertical tie rods which, with the thrust tubes which maintain the longitudinal position of the trucks, are mounted in rubber.

Underside of the car body and the recesses for the springs are covered with noise-absorbing material which minimizes the intensity of sound at its source, while the liberal use of rubber at all points of attachment between truck and car body eliminates direct transmission of objectionable truck noises.

Automotive engineers were invited for test rides, observed the action of "tumble blocks," which tumbled less than half as many times in the pendulum-type as in the standard type car, and convinced the experimenters that more conclusive than the indications of ride instruments are the personal reactions of seated passengers, who commended the lack of vibration, noise, and rumble, liked particularly the soft, smooth, gliding action of the car.

Mechanical advantages of the pendulum-type car, including simplicity of construction and elimination of moving surfaces carrying body weight, are believed to be applicable to motor buses. The designers say that such a freely resilient, yet inherently stable, support can make a motor coach as comfortable as any vehicle on roads or rails.



Diagrammatic application of pendulum suspension to motorcoach (story above)

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